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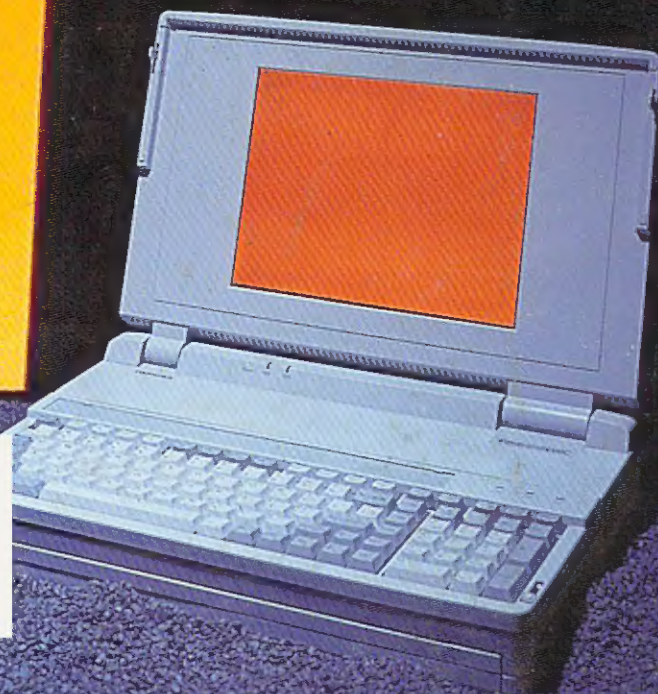
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64/128 VIEW

Mad Man Software is a new company with a new adventure game for the 64. Its average playing time is between 200 and 400 hours.

Tom Netsel

The rat looked as big as a Volkswagen, and it was charging straight at our hero. Outrunning such a creature was impossible. His only chance was to stand and fight, a pitifully small sword his only weapon. He drew it and took a swing at the rampaging rodent. Would the rat engulf him, or would his puny blow strike home?

As we held our breaths awaiting the outcome, it took a minute before we realized that nothing had happened. The rat was still there, our hero was still there, but the screen had frozen. Our first encounter with the game's first monster, and the program locked up. This was one of those embarrassing moments that can occur when a software representative demonstrates his company's latest product.

Reboot. Try again. Same thing. Groan! I was feeling sorry for Gene Barker. He's a recent graduate from the Colorado School of Mines who'd flown to North Carolina from Colorado to show the Gazette staff Messiah III: Nemesis, an adventure game for the 64 that he's been developing for almost six years. Now, when the game's lead character aims his first blow at the very first monster, years of programming grind to a halt.

Wait a minute! This 128 has a defective SID chip, and the program relies on one of the computer's voices to generate random numbers to help decide a battle's outcome. The program's in a loop, waiting for a random number to appear, and that chip is as silent as Harpo Marx! We

could be here until Godzilla comes home. Let's go down the hall and try another machine.

As I said, when someone comes all this way to demonstrate a major new release for the 64, you want things to go well. After all, there's not exactly a flood of new titles sweeping that market these days. In fact, it would take a madman to start a new company aimed at developing software for that veteran market. And that's just what Barker and ten associates have done. Their company is called Mad Man Software (7610 West 5th Avenue, Suite 200, Lakewood, Colorado). For the past year, they've been polishing Barker's game, and Messiah III should be ready by this fall or Christmas.

Messiah III is no lightweight arcade adventure, as we saw when we ran it on another machine. We were treated to a richly detailed adventure game that's the first of a six-game saga. Messiah III, which should sell for around \$60, consists of more than one megabyte of code. That's six disk sides. Disk access times have been reduced, however, so that the longest load should take no more than 12 seconds.

While we await the final version for review, Barker estimates the average playing time will take between 200 and 400 hours. When many new games are measured in megabytes, Barker doesn't feel the 64's memory constraints have placed limits on his creativity. "It's the game's design which dictates its power," he says, "not the machine." □

GAZETTE

64/128 VIEW

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Anybody who'd start a new company based on a new adventure game for the 64 must be a madman, but that's just what Gene Barker and friends have done. By Tom Netsel.

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Questions and answers about time, word processors, modems, programming languages, and MIDI

INPUT Time

Is there a way to change the value of TI\$ by using an INPUT statement from within a BASIC program?

KARL ROSEMAN
DENVER, CO

Try the following line in your program. It should do the trick nicely.

10 INPUT "NEW TIME"; TI\$

When the program runs and you see the INPUT prompt, enter your response with six digits in an HHMMSS format. HH equals hours, MM equals minutes, and SS equals seconds. For example, 123456 will set TI\$ to read 12:34:56. If you enter more or fewer digits, you'll get an ILLEGAL QUANTITY message. If the number is greater than 23:59:59, the clock resets to 00:00:00.

Bug-Swatter

The ending address of File Lord (May 1992) is incorrect. The correct address is 14C0. This affects MLX only and not the File Lord program. We prepared the listing after the documentation, and it was then that we noticed how long the program was. To make it easier to type in, we compressed the program with Mega-Squeeze but neglected to change the ending address.

The compression program may have affected the way the program starts. If you type RUN and get a READY message, simply type RUN again, and File Lord should start. The program on Gazette Disk wasn't affected.

80-Column Word Processor

Is there a word processor for the 64 that has a true 80-column screen? I am looking for one that's like the 128 or IBM, not a 40-column screen such as GEOS, which scrolls to reveal 80 columns. I am not look-

ing for one that simply has a preview screen either. Is there one that exists with this feature?

JON PERSINGER
INDIANAPOLIS, IN

You might try Script 64, published by Richvale Telecommunications of Canada. To the best of my knowledge, however, that company is no longer in business. You might locate a used copy of the program for about \$9 at Bare Bones Software, 940 4th Avenue, Suite 222, Huntington, West Virginia 25701, (800) 638-1123. Call or write for a free catalogue of used 64 and 128 software. They also carry Amiga products. Supplies are limited, so check with the company before ordering.

Modem Woes

I have a 64 with an Aprtek 12C modem used as a Volks 6480. I would like to play modem games with a friend, but I need the originate and answer codes that will correspond with my friend's Commodore 1670 modem. I can't find this information in the manual. Can you supply me with these codes?

MARTIN BOUTIN
LONGUEUIL, PQ
CANADA

Your modem, which can be used as a Volks 6480, is no longer in production, but you should have no problem using it to connect with your friend. It requires no special originate or answer codes or settings. It's Hayes compatible in that it supports automatic answering (ATA) and automatic dialing (ATDT) commands, just as your friend's 1670 does. You should be able to contact each other just as easily as you can connect with a local BBS.

Check the terminal or game software you're using

for requirements specific to that program. It may require manual dialing or answering. Also check the echo or duplex modes to make sure you both can see what each of you is typing. If you still think the modem is at fault, call Aprtek's service department at (503) 582-2118 from 8:00 a.m. to 4:30 p.m. Pacific time on weekdays.

Pascal Wanted

I am currently taking a course in Pascal at high school, using Turbo Pascal on a Macintosh. I have a 64 at home, and I would like to use Pascal with it. Is there such a compiler and where can I obtain it?

MIKE SMITH
CRYSTAL, MN

Contact Abacus, 5370 52nd Street SE, Grand Rapids, Michigan; (800) 451-4319, and ask about Super Pascal 64 (\$19.95). It implements the full Jensen & Wirth compiler plus extensions for graphics. It has a complete source file editor, a full assembler, and a utility package.

MIDI Info

I am interested in music and would like to get into MIDI. Is there a MIDI system available for the 64?

EDNA WILLIAMS
BRIDGEPORT, CT

Contact Dr. T's Music Software, 100 Crescent Road, Needham, Massachusetts 02194; (617) 455-1454, and ask for its free catalog of MIDI hardware and software. Dr. T offers a 64 MIDI starter pack that includes its Keyboard Controlled Sequencer, a MIDI interface, and two MIDI cables for \$180. A version for the 128 retails for \$275. You'll have to supply your own MIDI keyboard or other MIDI instrument. □

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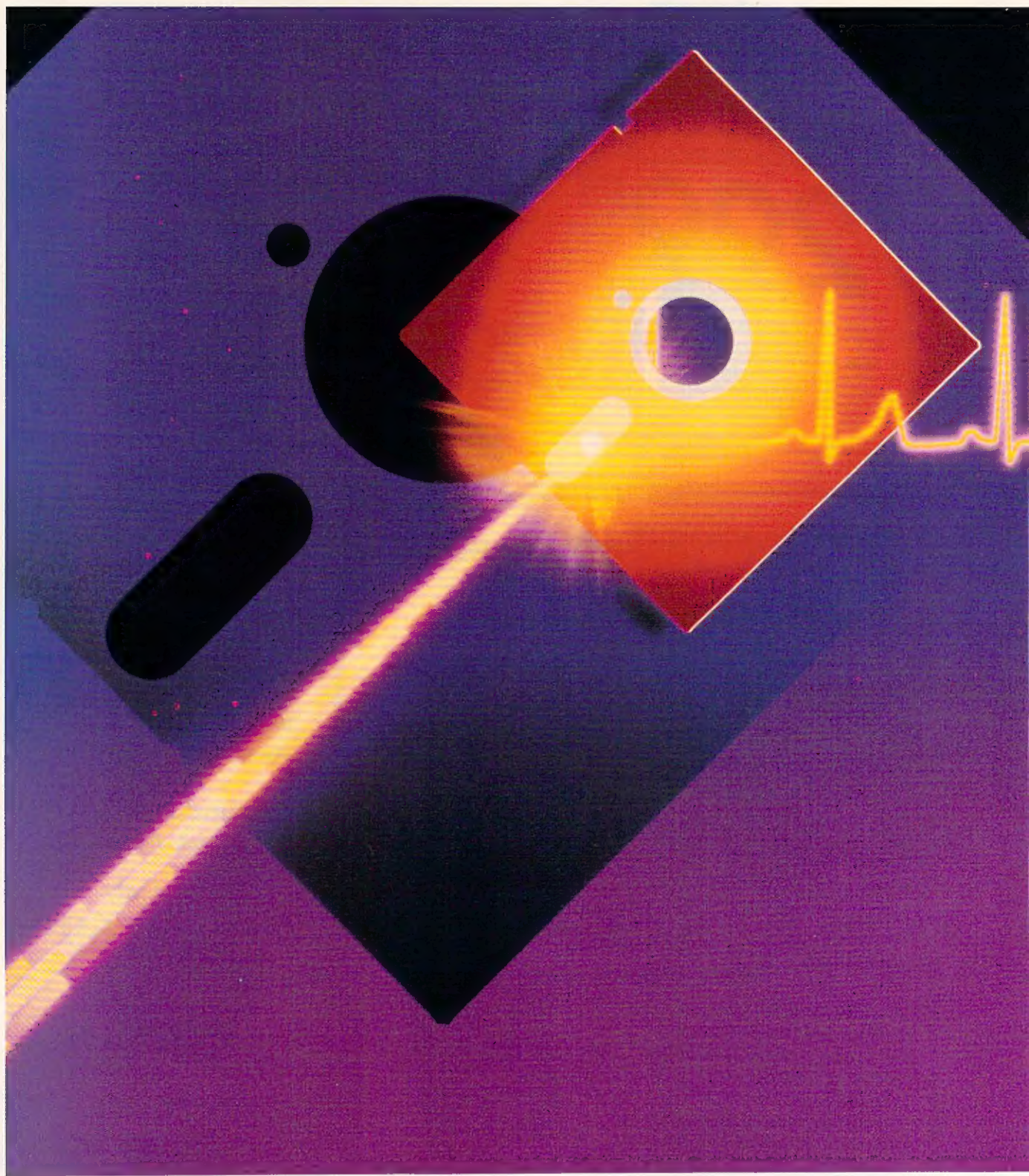


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FOR GREATER STORAGE CAPACITY IN A
SMALLER PACKAGE, THE 1581 IS
THE BIG DRIVE IN THE LITTLE BEIGE BOX.

BY GEORGE GUNN

The 1581 drive is a great piece of hardware for anyone who owns a 64 or 128, and it's also compatible with Plus/4, Commodore 16, and VIC 20. The 1581 is smaller than either the 1541 or 1571, yet it stores much more data on its disks. The 1581's 3½-inch disk holds nearly a megabyte of information (808,960 bytes). After formatting, 3,160 blocks are available to the user, with 40 blocks reserved for the disk's main directory. On a 1541, this would be equivalent to 4¾ floppies, each with 664 available blocks!

Having all this space makes it possible to store a huge number of files on one disk, but the directory scrolls off the screen if you have more than 22 files. This can make file management particularly difficult.

For this reason, the 1581 has a feature known as partitions. A partition is a space on a disk which the user sets aside for special use. For all intents and purposes, each partition is seen by the computer as a separate disk. Within the limits of certain parameters, you can create numerous partitions on each disk, with each partition containing whatever files you wish. Each partition can also have its own directory. You can even store files with the same filename on the same disk, because the computer thinks each partition is a separate disk drive.

Logical Disk Organization

When creating partitions, it's helpful to remember the 1581's logical disk organization. Although each 1581 disk is double-sided, the computer sees it as single-sided, with 80 tracks per disk (numbered 1–80) and 40 sectors (or blocks) per track (numbered 0–39).

It might be helpful to think of a formatted disk as consisting of a series of concentric circles. Each circle is a track, and each track is divided into several sectors.

Each partition must consist of one or more complete tracks; thus, a partition must be a multiple of 40 sectors in length and must begin on sector 0 of a given track. Remember that track 40 is reserved for the disk's main directory, so tracks 1–39 are available for partitioning, as are tracks 41–80. A partition may not include or pass over track 40.

Creating Partitions

The commands for creating partitions described in the 1581 user's guide are unwieldy and difficult to understand. Of greater help is the Partition Aid program on the demo disk that's supplied with the drive. Through a series of screens and prompts, this program asks for the partition name, beginning

track and sector, and total number of blocks you want in the partition. Suppose you want to create a partition called Arcade Games and set aside 600 blocks for it. After loading and running Partition Aid on the demo disk, you'd be presented with a screen that lists the following options.

1. SHOW PARTITIONS
2. CREATE PARTITIONS
3. DIRECTORY
4. CHANGE UNIT
5. QUIT

Since we don't have any partitions at this time, you'd skip the first choice. Choosing option 2 would take you to the next screen called Create a Partition. Here you'd see the following instructions on your screen.

MODIFYING SPEEDSCRIPT

Most people set their 1541 or 1571 as drive 8 and designate the 1581 as drive 9. If you use SpeedScript, which normally uses drive 8, there was formerly no easy way to save your files to drive 9 and use the 1581 as the data storage device.

Now there's a way to alter the program to access drive 9 instead. This will let you load SpeedScript from a 1541 or 1571 and save data to the 1581. Of course, since SpeedScript is fairly small, you can save this modified version to the 1581 and direct all of its disk commands to drive 9. To accomplish this, load a copy of SpeedScript into memory, but don't run it. Then enter the following two lines below in immediate mode.

**POKE 4843,9: POKE 4908,9: POKE 5274,9:
POKE 5873,9: POKE 5967,9
POKE 6367,9: POKE 6883,9: POKE 7003,9:
POKE 7073,9**

Then save the modified program to disk using a unique filename, such as SPEEDSCRIPT9. All disk commands will now access device number 9. You won't be able to switch at will between drive 8 and drive 9 from within SpeedScript, but you can choose to work from whichever version of SpeedScript you wish. If you try to alter such a program, however, be sure you don't alter your only copy of it. Make a backup copy first.

Of course, you must set the switches on the back of your 1581 to the proper combination. If both of your drives are set to the same device number, your system will lock up.

To set the drive number, turn off your 1581's power and look at the drive from the rear. To set it for drive 8, push both switches to the up position. To set it for drive 9, pull the left switch down and push the right switch up. To set the 1581 to drive 10, set the left switch up and the right one down. Pull both switches to the down position to set it for drive 11.

TO CREATE A SUBDIRECTORY YOUR PARTITION MUST

- (1) START ON SECTOR 0
- (2) BE AT LEAST 120 BLOCKS
- (3) BE A MULTIPLE OF 40 BLOCKS

At the prompt *Enter a partition name*, you would enter *Arcade games*.

Next, you're prompted for the beginning track. Since track 40 is reserved for the disk's directory, it may not be used. The partition may begin on any other track on the disk. This prompt appears onscreen as follows.

FIRST TRACK (1–39 or 41–80)
?

We'll begin this partition on the first track of the disk, so we should enter the number 1. Next, you're prompted for the first sector.

FIRST SECTOR (0–39)
?

For practically all purposes this would be 0, so enter 0 at the prompt.

Finally, you're prompted for the number of blocks you want in the partition. This must be a minimum of 120 and a multiple of 40.

NUMBER OF BLOCKS IN PARTITION
?

We're making a partition of 600 blocks (which, by the way, covers 15 tracks since $600/40=15$), so at this prompt we enter the number 600.

After this last prompt, all the necessary information has been gathered, and we're taken to a third screen, bearing the title *Create a Partition*. At the top of the screen we see the following message.

CREATING PARTITION: ARCADE
GAMES STATUS: 0 OK 0 0

Next, we're asked if we want to make a subdirectory for this partition. For most uses, you'll need a subdirectory, so at the prompt type *Yes*.

This brings up another prompt asking for a directory name. Here you should type the Partition Name *Arcade games*.

Finally we are prompted for the familiar two-character alphanumeric ID, well known to users of CBM BASIC. Let's number this partition 01.

From this prompt, the drive checks its status and tells us to press a key to continue.

We're then returned to the opening screen, where we may exit by pressing number 5. At this point we have placed a partition of 600 blocks on

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tracks 1 through 15 of the disk. The first track of this partition will be reserved for the partition's own directory. On the disk's main (root) directory, the partition will show up as the following.

600 "ARCADE GAMES" CBM

Partition from BASIC

The series of prompts in this program makes the process very easy. Of course, you can create partitions from BASIC if you can decipher the following code given in the user's manual.

```
PRINT#file#,"/0:partition name,"+
CHR$(starting track)+ CHR$(starting sector)+
CHR$( < # of sectors)+ CHR$( > # of sectors)+
",C"
```

Especially confusing are the expressions *< # of sectors* and *> # of sectors*. Evidently a misprint in the book has placed these two expressions in reverse order. After much experimentation, I've found that they essentially refer to the range of sectors contained in the partition. The expression *< # of sectors* should refer to the high number of this range (600 in our example above), and *> # of sectors* should refer to the bottom of this range (0 in our example). However, since a CHR\$ value may fall only within the range of 0-254, any partitions of more than 254 sectors have to use an adjusted value.

The *>* and *<* signs actually refer to the high byte and low byte for a given expression. There's a way to calculate values for partitions greater than 254 sectors. If N equals the number of sectors for a partition, the high byte would be represented by INT(N/256). The low byte would be represented by N-(low byte)*256. Thus, for our partition of 600, the high byte is INT(600/256) = 2. The low byte is 600-2*256 = 88. So, to create our partition of 600 blocks, we'd issue the following commands.

```
OPEN 15,8,15
PRINT#15,"/0:ARCADE GAMES,"+ CHR$(1)+
CHR$(0)+ CHR$(88)+ CHR$(2)+ ",C"
```

CHR\$(1) refers to the starting track of 1. CHR\$(0) refers to the partition's beginning sector in track 1. CHR\$(88) refers to the 600 block partition's low byte. CHR\$(2) refers to the 600 block partition's high byte.

Another Format

At this point the required blocks have been set aside as a partition, but the partition can't be used yet. It has to be formatted before you can store files in it even though the disk itself has already been formatted. This creates a partition directory (or subdirectory) on

the first track of the partition. So, with the disk still in the drive, the new partition is selected by the following line.

```
PRINT#15,"/0:ARCADE GAMES"
```

Then the NEW or HEADER commands are used to format this partition area. Enter the following line.

```
PRINT#15,"NO:ARCADE GAMES,01":
CLOSE15
```

CARTRIDGES

In addition to holding more information, the 1581 loads programs significantly faster than the 1541 or 1571. Because of a slightly different DOS than that used in a 1541, the 1581 isn't compatible with some fast load cartridges. I use the Epyx Fast Load Cartridge with my 1541, but it has to be disabled before I use the 1581. There are a couple of fast load programs for the 1581, and these work quite well.

Recently, I bought a Super Snapshot cartridge, after reading that it was compatible with the 1581 drive. After using it for a while, I'm very impressed with the performance of this cartridge. Most of its features work quite well with the 1581. The only shortcoming I've found is that its file utility isn't able to scratch a file from within a partition.

The partition is now ready to be used. We've done in BASIC what the Partition Aid program did for us through a series of easy-to-understand prompts. Files in the partition may now be written to, read from, scratched, renamed, and so on.

If you're interested in constructing your partitions from BASIC rather than using Partition Aid, the following table may prove useful. Consult it for a list of the high byte and low byte values of the given numbers of sectors.

No. of Sectors	High Byte	Low Byte
120	120	0
160	160	0
200	200	0
240	240	0
280	24	1
320	64	1
360	104	1
400	144	1
440	184	1
480	224	1
520	8	2
560	48	2
600	88	2
640	128	2
680	168	2
720	208	2
760	248	2

Partition Management

Now that you have partitions on your disk, how do you make practical use of them? One of the more useful purposes for partitions is grouping similar files. For example, on my SpeedScript word processing disk, I've set up one partition for the word processor itself. I have SpeedScript's accompanying programs and utilities (mail merge, 80-column preview, right margin justified, columns, and so on) in a partition located at tracks 1-8 (320 blocks). In addition, I have made three other partitions out of tracks 9-39 for holding document files. I call these DOCUMENTS1 (tracks 9-19), DOCUMENTS2 (tracks 20-29), and DOCUMENTS3 (tracks 30-39).

In each partition, the first track is reserved for a directory of that partition; the rest of the tracks are available for files. This partition directory doesn't show up when the disk's main (or root) directory is listed. After the partition has been selected, the computer treats that partition as if it were a disk in itself, and its own directory may be listed. On the disk's main directory, partition names are listed like other files, but the three-letter code (PRG, USR, SEQ) for a partition is CBM. Thus, on the word processor disk I described above, the disk's main directory looks like the following.

```
320 "SPEEDSCRIPT"      CBM
400 "DOCUMENTS1"      CBM
360 "DOCUMENTS2"      CBM
360 "DOCUMENTS3"      CBM
5  "CHANGE UNIT"      PRG
51 "1581 FAST LOADER" PRG
1  "1581 PATH"         PRG
12 "COPY 81"          PRG
1651 BLOCKS FREE
```

The first four items are my partitions, the next four items are utilities I commonly use with the 1581 drive that are stored on the unpartitioned part of the disk, and the last item lists the blocks still available.

Partition Selection

Once the disk is inserted in the drive, a partition can be selected from BASIC. The syntax for selecting a partition follows.

```
OPEN 15,8,15,"/0:partition name"
```

Of course, if you're using the 1581 as device 9, you should substitute the number 9 for the 8 in this statement. Once the partition has been selected, you simply work with it as if it were a separate disk of its own, loading, saving, verifying, validating, and so on. All of these commands affect only the selected par-

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tition, not the rest of the disk.

With the 64, all of the familiar BASIC 2 commands, NEW, COPY, RENAME, SCRATCH, INITIALIZE, and VALIDATE, which work with the 1541 drive, work with the 1581. If you have a 128, use the BASIC 7.0 commands as with the 1571. A partition's directory may also be listed from within the partition with the standard LOAD "\$",8: LIST.

Rather than using BASIC, I prefer using 1581 Path, a short machine language program that appeared in the June 1990 Gazette. This one-block program offers a simplified syntax for selecting partitions, loading programs, and moving between partitions.

From within your word processor, it's usually quite easy to move from partition to partition. Most word processors have a command for accessing the disk drive. In SpeedScript, the keypress sequence is Ctrl-Å. After pressing these keys you simply type /partition name and hit Return. If you need to go to the disk's main directory, enter Ctrl-Å, simply type /, and press Return. This should result in the message 02, partition selected.

Using Different Device Numbers

A potential software problem involves programs that routinely access drive 8. If you're using the 1581 as drive 9,

you'll encounter problems. If you're familiar with machine language monitors or disk sector editors, you may be able to modify such programs to work from drive 9. Most programs use the following six-byte combination to open a disk file.

A9 02 A2 08 A0 02

These bytes are the same as the BASIC command OPEN 2,8,2. To access other drives in BASIC, substitute the new drive number instead of using 8. The most recently accessed drive number is stored in memory location 186.

In machine language, therefore, you'd change the A2 08 to A2 BA so the program would load its files from the drive from which you booted it.

Utilities for the 1581

In addition to 1581 Path, which I've already mentioned, the utilities that come on the demo disk supplied with the 1581 are very good. Also, I have found several Gazette programs worthwhile additions to my 1581 library.

Check out 1581 FastLoader (January 1990). This program provides high-speed data transfers that are up to nine times faster than the standard Kernal load routine. It works with both the 64 and 128 and allows you to relocate

the program to nearly any memory location and to create autoboot files.

Copy 81 (November 1989) allows you to copy any BASIC or machine language file from the root or a partition of one disk to the root or a partition of another disk. It also lets you copy files from the root or partition of one disk to another partition on the same disk.

Another helpful program is 1581 Directory Sorter (July 1989). It sorts your directory entries in both alphabetical and reverse alphabetical order. It also allows you to arrange files manually in any order you want. This utility has the ability to detect whether it's running on a 64 or 128 and whether the 128 is in 40- or 80-column mode. In 128 mode, the program uses fast mode whenever possible. Unfortunately, this program works only on the disk's main directory, not on a partition's directory.

All in all, I highly recommend the 1581 drive to all 64 and 128 users. Its speed and storage capacity are immense improvements over the 1541 drive and, to a lesser extent, over the 1571 drive. Rigid-shelled 3½-inch disks are easier to handle and store than vulnerable 5¼-inch floppies. □

George Gunn is a Commodore owner who lives in Redding, California.



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REVIEWS

CHIP'S CHALLENGE

If you love puzzles, then Chip's Challenge from Epyx is for you. As the game begins, Chip MacCallahan, a real nerd, finds out he may be able to join his beloved Melinda's computer club, the Bit Busters. However, there's a catch to this offer. He must first complete 144 levels of a maze-like puzzle before he can attain the highest membership privilege of this very exclusive club. (That privilege is to be near Melinda, of course!) Your job is to help Chip complete these levels so he can be close to the love of his life.

The first few levels of Chip's Challenge are easy. But don't be fooled; the game gets more challenging as you progress to the higher levels. Each level is slightly more difficult than the previous one, but you have more than one chance to pass a level. For example, if you get killed by a monster, then you get to try that level again.

Some levels provide hints on what to do; others don't. From time to time you'll encounter levels that seem impossible to pass. Don't lose sleep over this, though. After several tries, the game gives you the option of continuing at this level or going to the next. It's best to avoid both of these options, however. Since scores are based on what level you reach and how quickly you pass to the next level of play, restarting or not completing a level only lowers your score.

If you exit the game for any reason, you don't have to start at the first level. Just remember the code for the level you reached, and you can start again at that point.

Each level has different types of puzzles to solve. No matter what obstacles you encounter, you must pass through a blinking exit to go to the next level. You may have to find your way through a maze in a certain amount of time. At another level, you may have to col-

picked up along the way.

There are many items to aid you at each level. Shields are important in that they allow you to walk through fire or even on water. Cleats prevent you from slipping on ice. Another very useful item is a magnet. If you manage to get

you progress to higher levels, you'll know more of what's expected of you and have a better idea of how to solve a particular puzzle. Thus, what you learn from early levels can help later in the game. For example, you may realize that certain creatures move in similar patterns or shoving a particular block on the water will help you build a bridge to cross a moat.

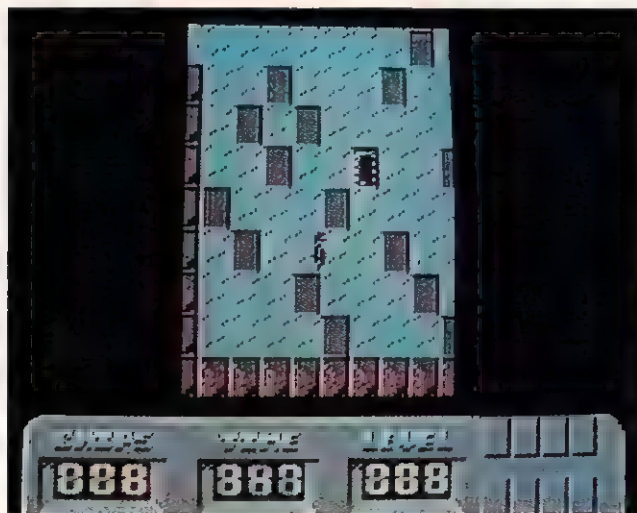
The documentation is brief but effective in getting you on your way to solving the 144 levels of puzzles. After a quick reading, you'll know what to expect and pick up some useful hints. It also provides a list of items and obstacles that you'll encounter while playing the game.

The graphics and sound for Chip's Challenge were average for the 64. Sometimes I found it was hard to tell what an onscreen item was supposed to be. If you have the manual nearby, most of the items in question can be matched to appropriate items from the list. The game's music gets boring after the first ten levels, so I did turn down the volume.

Overall, I rate Chip's Challenge highly. This delightful and interesting one-player game is a lot of fun to play. It'll keep you amused for hours and test your problem-solving skills as well.

Chip really wants to join the Bit Busters to be with Melinda, but he needs your help. Are you up for a real challenge? Chip is anxiously waiting for you at level 1!

CHRIS SAUCIER



You'll find plenty to keep you busy as you try to complete 144 levels of maze-like puzzles in Chip's Challenge.

lect a required number of microchips or other items while avoiding creatures that chase you. Some chips and items may be hidden or placed where they aren't easy to find. You'll have to solve a problem or two to get to these items. For example, walls can appear that were once invisible, or you may have to find a way to cross a castle moat.

Sometimes the order of how you try to accomplish a task is vital. At some of the more difficult levels, more than one type of puzzle must be solved at the same time. An information window always displays your level, the amount of time you have remaining to complete that level, the number of chips still to be collected, and the tools or keys you've

one of these, then you have control on force floors. If you can't get through a colored door, you may need a key of the same color. Colored buttons can also unlock doors for you and sometimes either control the movements of creatures you may encounter or deactivate bombs. Sometimes these creatures are guarding these keys or items you need. Blocks of dirt help you get across water. Numerous teleports jump you to other areas of the puzzle within that same level.

Chip's Challenge is very easy to learn and play. You use your joystick to control Chip's movements. The manual tells you what types of obstacles you'll face, but the experience you gain along the way is important, too. As

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PERFECT PRINT

I love GEOS. I use it all the time, but there's practically no way around the weak link in its system. GEOS dot-matrix printouts look like they've been, well, printed on a dot-matrix printer. Professional Page on Amiga or geoWrite on the IBM use beautiful scalable fonts that make dot-matrix printouts rival laser printouts for quality. With GEOS, unless you have a laser printer, you're stuck with blocky, jaggy, amateurish-looking fonts.

That's all changed now, because Creative Micro Designs, a company that seems determined single-handedly to carry the Commodore computers through the 1990s, has released Perfect Print, a new print package for geoWrite. Its printouts, using the GEOS LQ application, are incredible!

Let's get a few details straight. For one thing, Perfect Print works only with geoWrite. It won't work with geoPublish, no matter how hard we might wish. GEOS LQ, which produces the incredible geoWrite printouts, is only one part of the Perfect Print package.

Also included are a set of HQ (for High Quality) printer drivers and fonts designed to work especially well with each other. These drivers are standard GEOS printer drivers that work with any application, enhancing the printouts by using advanced interpolation techniques. They offer better results than the drivers that come with the GEOS system, even better than double-strike drivers. They aren't the stars of the Perfect Print show, though. You can find printer drivers on QuantumLink that will outperform the ones in the Perfect Print package.

The star of the Perfect Print package is GEOS LQ. Nothing anywhere can beat it. You won't believe it the first time one of these printouts comes slowly (and I do mean slowly) out of your lowly 9-pin workhorse.

I'm not talking about some pattern that's been

der the printhead.

To be fair, there are a few nagging inconveniences. Speed is the primary trade-off, as I mentioned above. A full page from geoWrite can take ten or fifteen minutes to print. Also, larger point sizes don't have the exquisite quality of the smaller ones. As a

vert their fonts to LQ format.

GEOS LQ is one of the more user-friendly programs around. You can start it from within geoWrite, using an included desk accessory. The control panel screen includes features you've probably never considered. The system fully supports both 9- and 24-pin printers, and everything is well explained in the documentation. You need know virtually nothing about control codes or your printer's inner workings to use GEOS LQ.

If you have any technical expertise, though, you'll find it possible to affect the GEOS LQ system at a basic level by changing the configuration files. These files are actually geoWrite documents, containing the various information your system needs to properly use GEOS LQ. Since they're standard geoWrite documents, they can be examined and altered quite easily. Some variations are already included on the disk, such as a file to set page length to label height and another to tell GEOS LQ to look for the fonts on a different drive from the one geoWrite is on.

These nifty touches are just icing on the cake, however. Unless you use GEOS for geoPublish or geoPaint only, you won't want to be without the Perfect Print package. Once again, CMD takes the Commodore and GEOS to unexpected and incredible heights.

STEVE VANDER ARK

This text is formatted in California 10-point. I'm going to print it out using an Epson 24-pin printer and the LQ-1500 printer driver. I'll switch to 14 point, **bold face**, *italics*, and underline modes and even print a graphic:



This text is formatted in California LQ 10-point. I'm going to print it out using an Epson 24-pin printer and Perfect Print's "GEOS LQ" system. I'll switch to 14 point, **bold face**, *italics*, and underline modes, use a fancy-styled font, and even print a graphic:



Here are examples of the way GEOS prints text and graphics (above). Beneath them are similar examples from Perfect Print.

overprinted so many times that all the jaggies have been mushed into the weave of the paper and struck so repeatedly that a small font looks like a smudge. No, this is print with absolutely perfect details, with precise curves and angles—even on a six-point font in italics. I'm talking printouts to die for!

Oh, come on, you say; there must be a catch. The manual is probably sketchy and obscure. The setup procedure probably requires a degree in advanced systems analysis to implement. The thing probably overheats the printer. But, no, the manual is clear and concise. It contains more information than most users will ever need. The setup procedure is straightforward, and your printer won't get hot un-

der the printhead. matter of fact, the larger sizes are basically printed using the same kind of interpolation routine used in the HQ drivers, which is good but not perfect. And while you can use most of the features of geoWrite, you can't use the page, date, or time functions in the header or footer to let the system print those for you automatically.

The only fonts that will print out in such high quality are the specially designated LQ fonts. Of course, there are more than 40 such fonts available with plenty of great designs to choose from. If you're so inclined, you can always convert or create more using the font-creation utilities included on the disk. On top of this, CMD has been actively soliciting some of the leading font designers to con-

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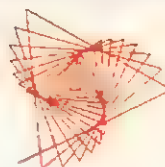
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REVIEWS

PREDATOR 2

So many computer games based on movies are nothing more than poor games wrapped in catchy visuals and logos from the film they represent. That's why you should be especially careful when buying games of this type. You should look beyond the references to and scenes from the film and search for some indication of what the game's all about.

Predator 2 has a strong basic game element that was adapted to fit the movie's plot. This is the way it's supposed to work. Predator 2 is a four-level shoot-'em-up that puts the player in the heat of battle in 1997 Los Angeles. You play the part of Danny Glover's character in the movie, Detective Lieutenant Mike Harrigan. Your ultimate goal is to beat the Predator creature that is stalking Los Angeles. You must survive four levels of action before the climactic battle. Each level is tougher than its predecessor and gives you less time to breathe. Although Predator 2 isn't difficult to play, only the best of the best will make it through the game. Most of your efforts will be spent trying to surpass your previous score in an attempt to make to the end.

Game mechanics are simple. Move the cross hairs around the sideways-scrolling screen with a joystick (recommended) or keyboard and press the fire button or space bar to fire your current weapon. Take out all the criminals who show signs of resistance and do it quickly. Power items make your stay on the current level more manageable. These include better and faster-firing weapons, body armor, and ammo clips that appear occasionally on the screen. Fire at them to collect them. A wave of criminals at the end of each level usually depletes your reserve lives and eliminates your chance for success. During this last volley, all of your shots must be well placed or the enemy will overwhelm you.

It'll take a few games before you get anywhere with Predator 2. More than any other computer game, good aim and conservation of ammo are extremely important. If you hold down the fire button, your weapon will continue to fire at its maximum rate. The Mark I Assault Shotgun shoots as fast as a machine gun, and it's very tempting to spread your fire. It's important to shoot the enemy in short bursts rather than laying down a constant bombardment because you'll need the firepower later in the level. Therein lies the key to Predator 2. Successful players will

learn to anticipate the enemies' appearances and eliminate the enemies before they get a chance to shoot. The longer you avoid return fire, the longer your current life lasts, and the better your chance at finishing the game.

The four levels are varied, with numerous challenges and unique features. You see the Predator's outline in all of the levels as he stalks his prey, but don't fire at him! If you do, he turns one of his weapons on you instead of the criminals. The first level takes place on the Los Angeles streets, with drug criminals against the police. It's a practice level compared to what's coming next.

The second level thrusts you into the penthouse apartment of the drug lord Ramon Vega. There are more criminals, and they come from all directions. The third level takes place in the subway tunnels. Just as in the real world, the subway's lights affect gameplay, especially when they shut off and you can't see the enemy. If you can survive, you'll soon confront the Predator. The last level opens the doors of a slaughterhouse for your infiltration. This abandoned warehouse is the perfect lair for the Predator. An exciting battle concludes the game—if you can make it this far.

Graphics are standard for Predator 2. This late in the life cycle of the 64, developers are more concerned with providing a good game with good graphics than they are with providing a poor game with great graphics. Predator 2 is the former. You can distinguish the guns before you collect them, but to help the less experienced, the name of each gun appears below it on the screen. An addictive theme tune makes Predator 2 a bit more exciting. Sound effects are fairly common. From a bells-and-whistles point of view, Predator 2 doesn't have much to offer. What shines through is strong gameplay.

Predator 2 is the latest product from the Konami/Image Works partnership for the 64 and 128. It makes good use of the machine's sprite and animation capabilities and packs a lot of fun in a simple game framework.

The constant challenge and addiction most players will find in Predator 2 is especially attractive to diehard shoot-'em-up fans. See if you can take out one of the more intelligent and deadly hunters in the universe!

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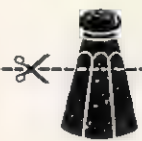
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BEGINNER BASIC

Larry Cotton

JOYSTICK OUTPUT

As we all know, the ubiquitous joystick has been around almost as long as the computer. When plugged into one of the 64's two joystick ports, it becomes an input device, translating hand movement to input the computer can use.

Few people know that joystick ports can also be used for output. Perusing the *Programmer's Reference Guide*, I noticed two little-mentioned memory registers—56322 and 56323—known as Data Direction Registers (DDR) for ports

A and B. These are ports 2 and 1, respectively, as labeled on the computer. These two registers, when properly programmed, have the ability to change a joystick port's direction of data flow from input to output! Address 56322 controls joystick port 2's memory register 56320; 56323 controls port 1's register at 56321. They behave similarly to the DDR at 56579, which determines whether the user port lines are set for input or output.

Each memory register in the 64 contains one byte, or eight bits. Those bits (numbered 0 through 7) can be controlled independently from BASIC with the Poke command. If you poke memory register 56323 with a 1, for instance, bit 0 will contain 1; it will be set for output. If you poke it with

a 17, bits 0 and 4 will be set for output. (All the rest will be at 0, for input.) Thus, one can independently control each of a particular joystick port's lines. It happens that bit 4 of 56323 controls port 1's fire button line.

Most joysticks use six wires

```
20 POKE56323,17: REM FIRE
    BUTTON OUTPUT, DISABLES
    KEYBOARD, TURNS LED OFF
30 FOR T=1 TO FT:NEXT
40 FOR I=1 TO B
50 POKE56321,16
60 FOR T=1 TO NT:NEXT
70 POKE56321,0
80 FOR T=1 TO FT:NEXT
90 NEXT
100 POKE56323,0: REM
    RESTORE TO NORMAL
```

Save the program to disk before going any further!

Memory register 56323 normally contains a 0. Because of the way the 64's keyboard is wired, poking values to that register will interfere with the keyboard's normal operation. To try this, poke a 1 to 56323.

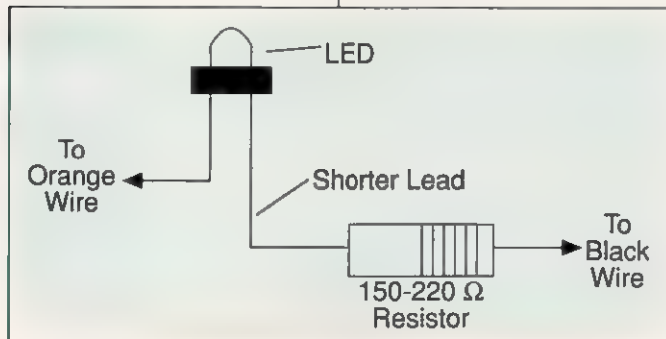
Turn your computer off and on again to restore keyboard operation. Plug the joystick cable into port 1. (That's the port closest to you.) Load and run the above program. The LED should blink three times and possibly will glow softly afterwards. The LED turns off completely when the line is changed to output.

Line 10 defines the constants NT, FT, and B for LED on-time, off-time, and number of blinks. Try changing these values. Line 20 pokes the DDR with a 17, which disables the keyboard and changes the fire button line to output. Poking a 16 works also but leaves the cursor in a strange place.

Lines 30, 60, and 80 control the times the LED is on or off. Line 40 begins a FOR-NEXT loop for the number of blinks; line 90 ends it. Lines 50 and 70 turn the fire button wire on (positive DC voltage) and off (ground potential), respectively. Line 100 restores port 1 to normal operation.

We'll look at more useful applications next month and learn how to control small electrical appliances. □

Joystick ports are usually input devices that receive data. Here's an easy way to reverse that flow.



A and B. These are ports 2 and 1, respectively, as labeled on the computer.

These two registers, when properly programmed, have the ability to change a joystick port's direction of data flow from input to output! Address 56322 controls joystick port 2's memory register 56320; 56323 controls port 1's register at 56321. They behave similarly to the DDR at 56579, which determines whether the user port lines are set for input or output.

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within the cable: the ground, the four direction lines (up, down, right, left), and the fire button. The fire button wire is usually orange, and the ground wire is usually black.

Select these two wires and join them with an LED and a resistor, as shown above. Connect the shorter lead of an LED to either end of a 150–220-ohm resistor and the longer lead to the orange fire button wire. Complete the circuit by attaching the free end of the resistor to the black ground wire.

If you don't happen to have LEDs at home, try Radio Shack's super-bright LED, catalogue number 276-087.

Now enter the following.

```
10 NT=900:FT=300:B=3: REM ON
    TIME, OFF TIME, AND NUMBER
    OF BLINKS
```


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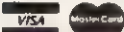
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MACHINE LANGUAGE

Jim Butterfield

SIMPLE STACK USAGE

The stack is used automatically by many activities. When your program calls a subroutine with JSR, the stack stores the return address. Later, the subroutine returns with RTS, and the stack delivers the stored address. Similar actions take place with RTI and interrupts. In every case, the stack is returned to its former condition automatically when the job is done.

The stack takes care of itself so well that it often remains a mystery to programmers. Since they don't often use the four stack-manipulation commands, programmers feel ill at ease with them. Here are those commands

PHA Push (copy) the contents of A to the stack.

PLA Pull the contents of the stack into A.

PHP Push (copy) the PSW (program status word) to the stack.

PLP Pull the contents of the stack into the PSW.

Using these commands is simple. Do you have something in the A register that you know you will need soon but not right now? Push it to the stack with PHA. You can store it there for a while then bring it back later with PLA. Perhaps you have a condition flag that you'll want to test later in the program but not immediately? Push all the flags with PHP, and bring them back with PLP when you want to test them.

There's only one vital rule that you must follow: If you put it on the stack, you *must* take it off. Leave a messy stack, and your program will crack. The last thing that you pushed

onto the stack is the first thing you must pull. After you push something to the stack, be very careful that your code never branches away, leaving a bad stack in place.

Let's write a small but useful program that uses the stack commands. It's a program to print the contents of a sequential file to the screen or to a printer.

The program will connect to the input file, take a byte, and disconnect. It will then connect to the output file, send that byte, and again disconnect. Then it will test to see if the input has signaled end-of-file (EOF). If not, back we go to do it all again.

The EOF condition is signaled in variable ST (status), address \$90 on current Commodore 8-bit machines. But here's the catch: It's signaled immediately following the input operation. If you examine the logic flow described above, you'll see that we test for EOF after we've performed an output operation. That's the right program point to do the test, but by that time, variable ST will have lost the vital EOF signal that was present after the program performed the input operation.

That means we should test the value of ST immediately after the input but we shouldn't branch based upon that test until a later program point. How may we preserve the condition flags? We do it with the PHP and PLP instructions.

A second problem arises. We read a byte from our input file by means of a call to the Kernal subroutine at \$FFE4. The value is placed into register A, which is just where we'll want it for output. Our next call, however, is to \$FFCC in order to disconnect from the input stream, and that will destroy the contents of the A register. The easiest solution is to preserve A with

the PHA and PLA instructions. Gosh, this is easy. Let's go to the code.

Logical file 1 will have been opened as our input; logical file 2 as our output. First, let's connect to the input stream.

```
2000 A2 01    LDX #$01    ;  
          logical file 1  
2002 20 C6 FF JSR $FFC6    ;  
          connect input  
2005 20 E4 FF JSR $FFE4    ;  
          input a byte
```

Now we test ST, address 90. A value of 0 means that we aren't at EOF and there are no other problems. Loading ST into the Y register will automatically set the Z flag if the value is 0; otherwise, the Z flag will be cleared. Either way, we'll push the flag to the stack and test it later.

```
2008 A4 90    LDY $90      ;  
          read ST (Z flag)  
200A 08       PHP          ;  
          save conditions to stack
```

The byte we received from the input stream is still in the A register. But we're about to make a couple of calls that will wipe it out. So let's put that on the stack, too. Remember that since it's the most recent thing we've put on the stack, it must be the first thing we pull.

```
200B 48       PHA          ;  
          save input byte
```

Now that the byte is safely stacked, we can disconnect our input.

```
200C 20 CC FF JSR $FFCC    ;  
          restore default I/O
```

Then we connect to our output stream, logical file 2.

```
200F A2 02    LDX #$02    ;  
          logical file 2  
2011 20 C9 FF JSR $FFC9    ;  
          connect output stream
```

The stack takes care of itself so well that it often remains a mystery to programmers.

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Now that we've connected, we're ready to output. All we have to do is pull the data byte back and send it.

```
2014 68 PLA
; restore input byte
2015 20 D2 FF JSR $FFD2
; output it
```

We've used the Kernal sub-routine at \$FFCC before, to disconnect the input stream. Now we use it to disconnect the output stream.

```
2018 20 CC FF JSR $FFCC
; restore default I/O
```

Now the program is ready to test for EOF. Let's bring back the Z flag that we stashed quite a while ago.

```
201B 28 PLP
; restore condition flags
201C F0 E2 BEQ $2000
; if not EOF, do it again
201E 60 RTS
; else back to BASIC
```

The BASIC code pokes the machine language code in

place, opens the input and output files, and then calls the machine language with a SYS command. When the ML program returns control, BASIC closes the two files.

This example of stack usage runs on all recent Commodore 8-bit computers. To run this program on the older CBM and PET computers, change the value 144 to 150 in line 100 and the value 4388 to 4396 in line 250.

```
100 DATA 162,1,32,198,255,
32,228,255,164,144,8,
72,32,204,255
110 DATA 162,2,32,201,255,
104,32,210,255,
32,204,255,40,240,
226,96
200 FOR J=8192 TO 8222
210 READ X
220 POKE J,X
230 T=T+X
240 NEXT J
250 IF T<>4388 THEN STOP
300 INPUT "NAME OF INPUT FILE";F$
310 OPEN 15,8,15
320 OPEN 1,8,3,F$
330 INPUT# 15,E$,E$,E1,E2
```

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```
340 IF E<>0 THEN PRINT
E$;E1;E2:STOP
350 INPUT "OUTPUT TO
SCREEN OR PRINTER";D$
360 D$=LEFT$(D$,1)
370 IF D$="S" THEN
A=3:GOTO 400
```

```
380 IF D$="P" THEN A=4:GOTO
400
390 GOTO 350
400 OPEN 2,A
410 SYS 8192
420 CLOSE 2
430 CLOSE 1
```

TYPING AIDS

MLX, our machine language entry program for the 64 and 128, and The Automatic Proofreader are utilities that help you type in Gazette programs without making mistakes. To make room for more programs, we no longer include these labor-saving utilities in every issue, but they can be found on each Gazette Disk and are printed in all issues of Gazette through June 1990.

If you don't have access to a back issue or to one of our disks, write to us, and we'll send you free printed copies of both of these handy programs for you to type in. We'll also include instructions on how to type in Gazette programs. Please enclose a self-addressed, stamped envelope. Send a self-addressed disk mailer with appropriate postage to receive these programs on disk.

Write to Typing Aids, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

GEOS

Steve Vander Ark

IN SEARCH OF A BETTER DESKTOP

Which GEOS application do you use the most? You might think it's geoWrite, but it's the deskTop. The deskTop lets you erase and copy files, page through disk directories, and load and run applications. The deskTop is like home base—where you go when you click on Quit.

Whenever you hit a quit button, GEOS looks for and runs the file called DESKTOP. Obviously, it wouldn't do to have an unsuspecting user rename his or her deskTop. That's why it's invisible to the system and why it isn't called an application in its info box. It's a GEOS system file 4, which is a file type you can't rename.

The deskTop, especially the 2.0 version, is very efficient, but it has some faults. Moving from page to page on the notepad, for example, is a fairly slow process, since the system must load each page and its icons separately. Also, the deskTop provides only marginal support for a third disk drive and until recently provided none at all for devices such as CMD's RAMLink.

Over the years, programmers have created several different file-handling applications to supplement the deskTop. These programs buy speed by using text instead of icons to list files. Most of them patch the GEOS system with a different filename so that a Quit command returns you to them instead of the deskTop. Here's a list of such programs.

DualTop. DualTop, as its name implies, does the deskTop one better by displaying the directories of two disks side by side. Standard file functions are accomplished by highlighting the filename and then clicking on one of the buttons on the screen. DualTop

supports three drives, including RAM drives.

On Q-Link, the 128 version is called 128DTV27.SFX, uploaded by RedSonia. DUALTOP is the 64 version, uploaded by JBUS.

WormDesk. This program provides all normal file functions, as well as an elaborate view system. The directory displayed can consist of only one type of file at a time. This usually is fine, but once in a while it's nice to be able to peruse an entire directory, an option not available on WormDesk.

The Q-Link filename is WORMDESK5.0, uploaded by geoWorm. It's for the 64 only.

QwikTop. The QwikTop screen is divided into eight boxes, each of which displays the files from a single page of the deskTop's notepad. The result is that you get to see seven pages at once, plus the border, with filenames shown in text. QwikTop saves space by including only the most often-used file functions, but the fact that you can view most of a disk's files at once and move them around from page to page almost instantly makes this one a joy for those of us who like to organize our disks. This one's a winner!

Q-Link filenames are QWIKTOP, uploaded by IL-LINI70, and QWIKTOP128.2, uploaded by GEOREP JIM.

Mini-Desk. This Jim Collette masterpiece is a desk accessory which provides access to a few essential file-handling options while you're within another application. I find this nifty program especially helpful when I'm working on a project where the application and the document are both in RAM. Mini-Desk lets me copy the file I'm working on to another drive, assuring me of a current copy even if the power fails.

Released as part of CommPlex Software's GeoWizard disk, the entire package is

\$16.95 from CommPlex Software, 6782 Junction Road, Pavilion, New York 14525.

Switcher. To avoid the delay while one application quits to the deskTop and another one loads, Switcher avoids the deskTop and provides a dialog box from which to open the next application. This isn't really a full-fledged deskTop replacement, but if your work requires moving from program to program, Switcher will certainly keep you jumping. Its very small size makes it a boon for single-drive geoPublish users. Its Q-Link filename is SWITCHER 1.3, uploaded by Student t.

gateWay. GateWay is more than a deskTop alternate. It's a full-blooded replacement with lots of great features. Until recently, gateWay was the only file-handling system which supported CMD's RAM-Link and RAMDrive. For more information, see the Gazette review (November 1991).

GateWay (\$29.95) is available in 64 and 128 versions from Creative Micro Designs, P.O. Box 646, East Longmeadow, Massachusetts 01028.

geoShell. GeoShell takes the GEOS environment full circle, replacing the graphics interface of the deskTop with text commands. While this might seem to you like a step backwards, the many hot-key commands and the speed of this program might instead lead you to decide that it's the most efficient file-handling routine around. For example, by typing the filename of a file on the current disk and pressing Return, geoShell quickly scans the directory and then loads and runs the file. There's no need to page through a slew of icons or scroll through a directory.

For more information about geoShell, contact Maurice Randall, 215 East Harris, Charlotte, Michigan 48813. □

The GEOS deskTop is a very efficient program, but it has its faults. Here's a look at some deskTop alternatives.

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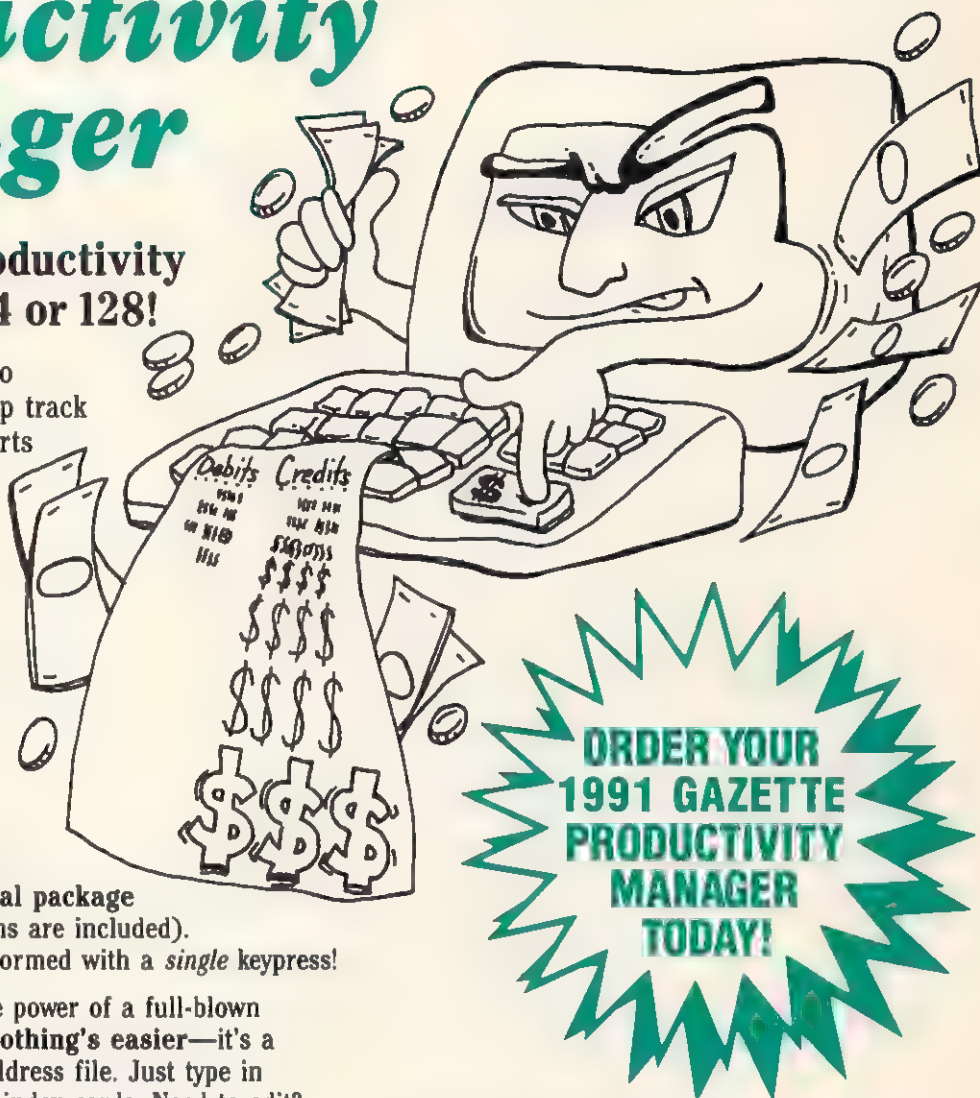
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D'IVERSIONS

Fred D'Ignazio

DIGITAL IMMORTALITY

When I was a child, I used to think I was immortal. I couldn't die. This type of attitude naturally led to several life-threatening experiences, such as jumping off roofs, almost getting hit by cars, and climbing on cliffs. I concluded that my surviving these activities demonstrated my invulnerability.

When I grew older and had experienced the deaths of my uncle, a favorite grandmother, and a few assorted movie stars and pets, I grew wiser. I realized that maybe I wasn't immortal. Maybe I could die. But, heck, I was young. Death was probably 50, 60, maybe 80 years away. I was hopeful. Someone was bound to discover a cure for old age way before I got close to dying.

I clung to this notion of a fountain of youth for quite a few years, but now it's starting to dry up. It's getting harder to believe in medical miracles. I'm 43, and there doesn't seem to be a miracle drug on the horizon. In fact, things seem to be getting worse. With the upsurge in crime, violence, AIDS, and so on, I feel far more at risk now than I did when I was younger.

The other night I was watching television, feeling kind of blue, and I spotted a commercial that features Elton John playing alongside Louis Armstrong, Humphrey Bogart, and James Cagney. Through special digital techniques, movie images of these long-dead superstars have been added to a new ad that features a very much alive Elton John.

The next night I tuned into the Grammy Awards and saw Natalie Cole win a Grammy for her song "Unforgettable." To create this version, she used digital techniques to weave her father's original song into

a new recording in which the two of them sing a duet. Nat King Cole is dead, but that didn't stop his daughter from resurrecting his unforgettable solo and changing it into a hauntingly beautiful father-daughter masterpiece.

Both of these instances qualify as digital immortality. I know that Cagney, Bogart, Cole, and Armstrong are dead, but I did see and hear them on television the other night in new productions.

The Elton John commercial and the Natalie Cole song have been so successful that they're sure to spawn a host of imitations. Television companies, movie houses, and ad agencies will search their archives to resurrect film stars, political figures, authors, athletes, heroes, villains, and saints to mix their images with contemporary media figures. We'll soon be flooded with songs and commercials digitally combining the dead and the undead: Marilyn Monroe with Madonna, W. C. Fields with Danny DeVito, Lou Gehrig with Jose Canseco, Teddy Roosevelt with George Bush, Steve Martin with the Three Stooges.

In fact, virtual immortality is nothing new. We've been getting accustomed to it for years. What's the effect of media stars dying? If they're popular, it doesn't mean that we no longer see them. All it means is that we don't get any new material. We still see reruns of their best work.

Are Bing Crosby and Danny Kaye gone? It doesn't seem like it after I've watched *White Christmas*. What about Judy Garland? Not after seeing *Wizard of Oz* with my three-year-old. How about Spencer Tracy, John F. Kennedy, or Jim Morrison? It's hard to imagine Lucille Ball gone after watching one of her wonderful "I Love Lucy" episodes.

The truth is that my memory of a star's death pales in comparison to the vivid, poignant evidence of his or her survival on the television or movie screen. The stars seem still alive when I see them in the midst of news programs, sitcoms, and commercials that feature the products and celebrities of the here and now.

This brings me to my own death, or, hopefully, my own virtual immortality. I may give up on cryogenics, miracle drugs, and fountains of youth, but I might still achieve immortality through multimedia.

I can see a whole new industry springing up as funeral homes retrofit middle-aged and older Americans with digital re-creations of their lives. They can interview us to capture our voices and images. They can scan in photographs and digitize home movies and audio tapes to capture us during our youth and our adulthood. They can embed us in the era in which we lived and put a spin on the whole presentation. How do we want to be remembered? Nostalgically? Romantically? Dashing? Respectfully? Producers at multimedia funeral homes will be able to remaster our lives digitally and dramatize them according to our wishes.

"This Is Your Life, Fred D'Ignazio." That's what I'll get. I'll pay about a thousand dollars. It'll take only a couple of days to create at the local funeral home equivalent of a one-hour Insty-Prints or Moto-Photo. I'll be packaged on CD-ROM. I'll get a dozen copies to distribute to my wife, children, and close friends. Whenever they miss me or want to remember how I was, they'll boot up my disc in their computer, and I'll spring to life, just like Bogart, Armstrong, Cagney, and Cole.

I'll be immortal. I won't notice, but others will. □

Don't let death act
as an obstacle
to your future. Use
multimedia as
a springboard to
immortality.

PROGRAMS

POP-UP

By Richard Penn

While entering data for an applications program, you suddenly need to make a calculation. You press a key, call up a calculator screen, determine the answer that you need, and then continue with your main program.

The telephone rings while you're working on a report, and you need to check a date while discussing an appointment. You press a key, call up a calendar, and then return to your report.

Afterward, prior to printing your report, you call up a smart help screen—one that knows you're ready to print and displays only a summary of printer commands, not the ten previous pages of instructions that you don't need.

If you think this sounds like something only an expert programmer could do in machine language, you're wrong. Pop-Up allows you to add pop-up desk tools to BASIC programs as easily as writing a GOSUB subroutine, and it lets you call them with a single command!

Typing It In

Pop-Up consists of three programs. The first is the actual machine language routine, so you'll need to use MLX, our machine language entry program to enter it. See "Typing Aids" elsewhere in this section. When MLX prompts you, respond with the values given below.

Starting address: C000

Ending address: C607

Before exiting MLX, save a copy of this program with the name POP-UP. The enclosed demonstration program looks for that name when it runs.

A second machine language program contains sprite data for an on-screen calculator that's used in the demonstration program. Again, you'll need MLX to type it in. When MLX prompts you, respond with the following values.

Starting address: 3E00

Ending address: 3FFF

When you've finished typing, be sure to save a copy of the program as CALCULATOR.SPR.

Finally, Demo is a BASIC program

that shows how to use Pop-Up. To prevent typing errors, enter it with The Automatic Proofreader; see "Typing Aids" again elsewhere in this section.

Put It to Work

To use Pop-Up in your own applications, add lines 30-40 of Demo to the beginning of your BASIC programs. Now let's take a look at how it works.

Two Commands

Pop-Up works by setting up a branch key. Whenever f1 is pressed, the running BASIC program is suspended, and execution branches to a selected line. This subroutine, which runs independently with its own variables, contains the code for the pop-up tool. Pressing f1 again returns you to the main program without a hint that anything ever happened. Think of it as a powerful GOSUB key that jumps to a subroutine with its own screen, VIC-II chip, and variables.

There are only two commands to learn. The first, SYS 49752, *line*, enables Pop-Up and selects the line to branch to. This command should be used at the beginning of your program. The second command, SYS 49877, disables Pop-Up.

Programming Desk Tools

A BASIC routine for an accessory such as a calculator is practically no different from any other subroutine, except that you must write it as a stand-alone program that loops endlessly. Think of an accessory as a new program that runs from the main program whenever you press f1. This new program continues until you press f1 again to exit. You'll see a programming example of this by using a calculator in Demo.

When you press f1, the machine language routines save all important information about the main program, such as BASIC pointers, screen and color memory, the VIC-II chip, and variables. Then BASIC jumps to the subroutine selected by the SYS 49752, *line* command and executes it, just as if RUN were typed. This subroutine has its own variables (2559 bytes stored at memory locations 50689-53247) that are cleared each time you press f1. The display, however, isn't cleared, so

your pop-up tools can be printed over the current screen for a window effect. The only quirk is that the cursor is positioned one column to the right of the home location whenever f1 is pressed the second time.

No changes made to the screen or sprites by the subroutine called by Pop-Up are permanent. Pressing f1 again restores the original program and screen. The only exception is the SID chip, which cannot be peeked and therefore cannot be saved.

More Than One

What if you want several accessories? Include a menu at the beginning of the Pop-Up subroutine for the user to select. You might include a calculator, calendar, and notepad.

When programming Pop-Up tools, it's best to write them separately and then merge them with your main program once they're debugged. This is because only the main set of variables is available to the BASIC editor. If you press Run/Stop while a Pop-Up subroutine is running and then type PRINT A, the value of A in the main program, not the subroutine, will be returned.

Also, note that a renumbering utility won't recognize the new SYS 49752, *line* command. You'll have to change its line number yourself.

Smart Help Screens

Suppose you have a two-part program in which you first enter data and then print a report. Some programs offer a help key, and dumb help screens are always displayed in the same sequence. That means users who need information about printing but don't need help for entering data have to see the data-entry help screen anyway because it comes first. Smart help screens eliminate flipping through unwanted screens because they know where you are in a program and only display relevant information.

Programming them with Pop-Up is easy. In our example program, you might insert the command POKE 679,1 at the beginning of the data-entry routine, and POKE 679,2 at the start of the report-printing routine.

The help screen subroutine (called with f1) would check location 679 with a line such as IF PEEK(679)=1 THEN

2000 : REM PRINT DATA ENTRY
HELP SCREEN. If it contained a 1, the
data-entry help screen would be print-
ed. If location 679 held a 2, the pro-
gram would jump to 3000 where a re-
port help screen would be displayed.
For a longer program, just include
more flags and IF/THEN statements.

New Look and Feel

Pop-Up gives BASIC a new look and
feel. Never before could software writ-
ten in BASIC be so user-friendly, nor
did the BASIC programmer have so
much power at his fingertips. The pos-
sible click-on accessories are limited only
by your programming ability.

Even if you don't want to program
your own accessories, you can use the
demonstration's Pop-Up calculator in
your own programs by including lines
20-60 and 1000-1390.

POP-UP

```
C000:A2 02 B5 00 9D FD A2 E8 1D
C008:E0 FB D0 F6 A9 FF 85 FB D6
C010:A9 00 85 FC A9 F6 85 FD 19
C018:A9 A3 85 FE A0 00 B1 FB 5C
C020:91 FD E6 FD D0 02 E6 FE 02
C028:E6 FB D0 02 E6 FC A5 FB C8
C030:C9 10 D0 EA A5 FC C9 03 1B
C038:D0 E4 A9 00 85 FB A9 04 04
C040:85 FC A9 07 85 FD A9 A6 87
C048:85 FE B1 FB 91 FD E6 FD 92
C050:D0 02 E6 FE E6 FB D0 02 52
C058:E6 FC A5 FB C9 E8 D0 EA 7F
C060:A5 FC C9 07 D0 E4 A9 00 0B
C068:85 FB A9 D8 85 FC A9 EF D1
C070:85 FD A9 A9 85 FE B1 FB 8B
C078:91 FD E6 FD D0 02 E6 FE 5A
C080:E6 FB D0 02 E6 FC A5 FB 21
C088:C9 E8 D0 EA A5 FC C9 DB 82
C090:D0 E4 A2 00 BD 00 D0 9D 35
C098:D7 AD E8 E0 2F D0 F5 BA FF
C0A0:8E 06 AE A9 36 85 01 A2 C7
C0A8:02 BD 00 A0 95 00 E8 E0 04
C0B0:D9 D0 F6 A2 F3 BD 00 A0 93
C0B8:95 00 E8 E0 FB D0 F6 A9 EA
C0C0:EB 85 FB A9 A0 85 FC A9 72
C0C8:FF 85 FD A9 00 85 FE B1 CB
C0D0:FB 91 FD E6 FD D0 02 E6 01
C0D8:FE E6 FB D0 02 E6 FC A5 6B
C0E0:FB C9 6D D0 EA A5 FC C9 3F
C0E8:A2 D0 E4 AE FC A2 A9 37 74
C0F0:85 01 9A A9 F6 8D 24 03 9C
C0F8:A9 C1 8D 25 03 A9 13 8D 36
C100:77 02 A9 0D 8D 78 02 A9 C1
C108:02 85 C6 A9 1A 8D 02 03 6F
C110:A9 C2 8D 03 03 CA 1A B5 87
C118:D8 09 80 95 D8 CA D0 F7 3F
C120:A2 08 BD F7 07 9D EA C5 78
C128:CA D0 F7 4C 31 EA A9 36 C7
C130:85 01 A2 02 BD FD A2 95 EB
C138:00 E8 E0 FB D0 F6 A9 FF 87
C140:85 FB A9 00 85 FC A9 F6 25
```

```
C148:85 FD A9 A3 85 FE A0 00 E6
C150:B1 FD 91 FB E6 FD D0 02 F0
C158:E6 FE E6 FB D0 02 E6 FC 05
C160:A5 FB C9 10 D0 EA A5 FC 6A
C168:C9 03 D0 E4 A9 00 85 FB 4E
C170:A9 04 85 FC A9 07 85 FD BC
C178:A9 A6 85 FE B1 FD 91 FB BF
C180:E6 FD D0 02 E6 FE E6 FB 2E
C188:D0 02 E6 FC A5 FB C9 E8 3B
C190:D0 EA A5 FC C9 07 D0 E4 AC
C198:A9 00 85 FB A9 D8 85 FC 1A
C1A0:A9 EF 85 FD A9 A9 85 FE 83
C1A8:B1 FD 91 FB E6 FD D0 02 49
C1B0:E6 FE E6 FB D0 02 E6 FC 5D
C1B8:A5 FB C9 E8 D0 EA A5 FC 50
C1C0:C9 DB D0 E4 A2 00 BD D7 F0
C1C8:AD 9D 00 D0 E8 E0 2F D0 91
C1D0:F5 AE 06 AE A9 37 85 01 DC
C1D8:9A 4C F3 C5 EA EA A9 1A
C1E0:83 8D 02 03 A9 A4 8D 03 F7
C1E8:03 A9 57 8D 24 03 A9 F1 8E
C1F0:8D 25 03 4C 31 EA A9 57 89
C1F8:8D 24 03 A9 F1 8D 25 03 5A
C200:08 A9 00 2B 90 FF 28 20 EA
C208:60 A6 AD E0 C2 85 15 AD DF
C210:EC C2 85 14 20 A6 A8 4C E7
C218:AE A7 78 8D E9 C2 8E EA 29
C220:C2 A9 83 8D 02 03 A9 A4 CE
C228:8D 03 83 A9 57 8D 24 03 6C
C230:A9 F1 8D 25 03 A9 00 8D 57
C238:E7 C2 A9 36 85 01 A2 2D 9D
C240:BD FD A2 95 00 E8 E0 39 70
C248:D0 F6 A9 37 85 01 AD E9 12
C250:C2 AE EA C2 58 4C 83 A4 0C
C258:A9 EE 85 FB A9 C2 85 FC 3F
C260:A9 00 85 FD A9 A0 85 FE 25
C268:A0 00 B1 FE 91 FD E6 FD 84
C270:D0 02 E6 FE E6 FB D0 02 76
C278:E6 FC A5 FD C9 FD D0 EA 18
C280:A5 FE C9 A2 D0 E4 20 FD 54
C288:AE 20 8A AD 20 F7 B7 A5 8F
C290:14 8D EC C2 A5 15 8D EB D5
C298:C2 A9 00 8D E7 C2 78 A9 A7
C2A0:AB 8D 14 03 A9 C2 8D 15 9A
C2A8:03 58 60 A5 C5 CD E8 C2 26
C2B0:F0 20 8D E8 C2 C9 40 F0 A5
C2B8:19 C9 04 D0 15 AD 8D 02 47
C2C0:D0 10 AD E7 C2 49 02 8D B3
C2C8:E7 C2 F0 03 4C 00 C0 4C 71
C2D0:2E C1 4C 31 EA 78 A9 31 38
C2D8:8D 14 03 A9 EA 8D 15 03 DF
C2E0:A9 00 8D E7 C2 58 60 00 A3
C2E8:04 40 00 03 EA FF 94 FF 31
C2F0:00 AA B1 91 B3 22 22 00 DA
C2F8:00 4C 00 FF 00 04 00 00 A1
C300:02 00 7F CB 19 16 00 0A 60
C308:76 A3 04 EA 0B 00 00 00 3B
C310:76 A3 B3 BD 51 00 00 00 98
C318:00 01 08 01 C6 01 C6 01 B9
C320:C6 FF CF 00 00 FF CF FA 9F
C328:FF FA 00 4F 0C 5C 4E D3 A5
C330:17 03 02 53 41 24 18 1E 62
C338:18 FF 0B 00 00 00 1E 18 81
C340:00 03 4C B7 00 00 69 17 77
C348:62 17 00 00 00 00 00 0A D0
C350:76 A3 19 00 00 00 00 9A AF
C358:CB 7A 00 00 00 76 00 80 BE
C360:A3 E6 7A D0 02 E6 7B AD 20
C368:06 02 C9 3A B0 0A C9 20 B1
C370:F0 EF 38 E9 30 38 E9 D0 19
```

```
C378:60 80 4F C7 52 58 40 FF 2B
C380:00 00 55 FF 00 00 00 00 B2
C388:03 00 00 80 00 00 00 24 BD
C390:6C 55 00 00 00 00 00 00 A3
C398:00 00 00 00 D6 17 00 00 33
C3A0:3C 03 00 00 00 06 00 60 7F
C3A8:08 FA 9F 00 00 00 00 00 E6
C3B0:A0 01 08 04 00 00 00 00 26
C3B8:00 04 00 02 20 00 00 00 62
C3C0:04 00 00 27 00 85 00 FF D2
C3C8:00 00 FF FF 00 00 FF FF 50
C3D0:00 00 FF FF 00 00 FF FF 58
C3D8:00 20 20 34 39 37 35 35 F5
C3E0:00 30 30 30 30 FF 00 00 FE
C3E8:FF FF 00 00 FF FF 00 00 70
C3F0:FF FF 00 00 FF FF 00 00 78
C3F8:FF FF 00 00 FF FF 00 00 80
C400:FF FF 00 00 FF FF 00 00 89
C408:FF FF 00 00 FF FF 00 00 91
C410:FF FF 00 00 FF FF 00 00 99
C418:FF FF 00 00 FF FF 00 00 A1
C420:FF FF 00 00 FF FF 00 00 A9
C428:FF FF 00 00 FF FF 00 00 B1
C430:FF FF 00 00 FF FF 00 00 B9
C438:FF FF 00 00 FF FF 00 00 C1
C440:FF FF 00 00 FF FF 00 00 C9
C448:FF FF 00 00 FF FF 00 00 D1
C450:FF FF 00 00 FF FF 00 00 D9
C458:FF FF 00 00 FF FF 00 00 E1
C460:FF FF 00 00 FF FF 00 00 E9
C468:FF FF 00 00 FF FF 00 00 F1
C470:FF FF 00 00 FF FF 00 00 F9
C478:FF FF 00 00 FF FF 00 00 02
C480:FF FF 00 00 FF FF 00 00 0A
C488:FF FF 00 00 FF 7D EA 00 DD
C490:FF 00 22 0E BC 81 7D EA 11
C498:7D EA 00 17 C8 0E BC 81 86
C4A0:85 BD 0C BD BA 0E 0F FF E5
C4A8:7D EA 02 07 20 21 DA E4 7C
C4B0:0D 07 FF 7D 78 85 01 00 36
C4B8:22 CF E5 00 0A 14 E1 64 CC
C4C0:A5 85 A4 81 F4 17 81 80 B2
C4C8:00 00 00 01 86 60 00 00 18
C4D0:00 0E 01 0C 74 A7 79 A6 9A
C4D8:9C 2C 9E 35 32 30 39 35 DC
C4E0:00 35 00 00 00 00 00 00 B7
C4E8:2E 4F 42 4A 22 2C 38 2C A8
C4F0:31 00 00 00 00 00 00 00 13
C4F8:00 00 00 00 00 00 00 00 82
C500:00 00 00 00 00 00 00 00 8B
C508:00 00 00 00 00 00 00 00 93
C510:00 00 00 00 00 00 00 00 9B
C518:00 00 00 00 00 00 00 00 A3
C520:00 00 00 00 00 00 00 00 AB
C528:00 00 00 00 00 00 00 00 B3
C530:00 00 00 00 00 00 00 00 BB
C538:00 00 00 00 00 00 00 00 C3
C540:00 00 00 00 00 00 00 00 CB
C548:00 00 00 00 00 00 00 00 D3
C550:00 00 00 00 00 00 00 00 DB
C558:00 00 00 00 00 00 00 00 65
C560:0E F6 04 0A 00 02 10 00 F9
C568:00 48 EB 00 00 00 00 00 83
C570:00 00 00 00 00 00 00 00 FB
C578:00 00 00 00 00 00 00 00 04
C580:00 A9 57 8D 24 03 A9 F1 AC
C588:8D 25 03 A9 00 85 15 A9 09
C590:64 85 14 20 A6 A8 4C AE 53
C598:A7 00 00 00 00 00 00 00 F7
C5A0:00 00 00 00 00 00 00 00 2C
```



```

C5A8:00 00 00 00 00 00 00 00 34
C5B0:00 00 00 00 00 00 00 00 3C
C5B8:00 00 00 00 00 00 00 00 44
C5C0:00 00 00 00 00 00 00 00 4C
C5C8:00 00 00 00 00 00 00 00 54
C5D0:00 00 00 00 00 00 00 00 5C
C5D8:00 00 0B E3 83 A4 7C A5 61
C5E0:1A A7 E4 A7 86 AE CB 00 01
C5E8:00 B0 DA 56 00 9F 04 74 5C
C5F0:6B 8E 53 A2 08 BD EA C5 3D
C5F8:9D F7 07 CA D0 F7 4C DF BD
C600:C1 00 00 00 00 00 00 00 6E

```

CALCULATOR.SPR

```

3E00:5E 5E B0 5E 5E B0 5E 5E 10
3E08:B0 BE BE B0 AA AA B0 AA 7B
3E10:AA 00 FF FF F0 00 00 00 95
3E18:00 00 00 00 00 00 00 00 94
3E20:00 00 00 00 00 00 00 00 9C
3E28:00 00 00 00 00 00 00 00 A4
3E30:00 00 00 00 00 00 00 00 AC
3E38:00 00 00 00 00 00 00 00 F3
3E40:AA 5E 5E AA 5E 5E AA 5E 40
3E48:5E AA BE BE AA AA AA AA 62
3E50:AA AA FF FF FF 00 00 00 CC
3E58:00 00 00 00 00 00 00 00 D4
3E60:00 00 00 00 00 00 00 00 DC
3E68:00 00 00 00 00 00 00 00 E4
3E70:00 00 00 00 00 00 00 00 EC
3E78:00 00 00 00 00 00 00 00 5A 4F
3E80:5E 5E 5E 5E 5E 5E 5E 5E FC
3E88:5E BE BE BE AA AA AA AA A7
3E90:AA AA FF FF FF 00 00 00 0D
3E98:00 00 00 00 00 00 00 00 15
3EA0:00 00 00 00 00 00 00 00 1D
3EA8:00 00 00 00 00 00 00 00 25
3EB0:00 00 00 00 00 00 00 00 2D
3EB8:00 00 00 00 00 00 00 00 5A 8F
3EC0:6A A5 5E 6A A5 5E 6A A5 6F
3EC8:5E 6A AB FE 6A AA AA 6A 32
3ED0:AA AA 7F FF FF 00 00 00 3D
3ED8:00 00 00 00 00 00 00 00 55
3EE0:00 00 00 00 00 00 00 00 5D
3EE8:00 00 00 00 00 00 00 00 65
3EF0:00 00 00 00 00 00 00 00 6D
3EF8:00 00 00 00 00 00 00 00 75
3F00:55 55 50 AA AA B0 AA AA 4B
3F08:B0 AA AA B0 5A 5A B0 5E E5
3F10:5E B0 5E 5E B0 5E 5E B0 08
3F18:BE BE 00 AA AA B0 AA AA 7D
3F20:B0 AA AA B0 5A 5A B0 5E FD
3F28:5E B0 5E 5E B0 5E 5E B0 20
3F30:BE BE 00 AA AA B0 AA AA 96
3F38:B0 AA AA B0 5A 5A B0 A5 5D
3F40:55 55 55 AA AA AA AA 14
3F48:AA AA AA AA 5A 5A EA 25
3F50:5E 5E EA 5E 5E EA 5E 92
3F58:EA BE BE AA AA AA AA 7E
3F60:AA AA AA AA 5A 5A AA FC
3F68:5E 5E AA 5E 5E AA 5E A1
3F70:AA BE BE AA AA AA AA 76
3F78:AA AA AA AA 5A 5A C0 2B
3F80:55 55 55 AA AA AA AA 54
3F88:AA AA AA AA 55 55 55 07
3F90:55 55 55 55 55 55 55 0F
3F98:FF FF FF AA AA AA AA C1
3FA0:AA AA AA AA 5A 5A 5A 6E
3FA8:5E 5E 5E 5E 5E 5E 5E 27
3FB0:BE BE BE AA AA AA AA C0

```

```

3FB8:AA AA AA AA 5A 5A 5A C0 E8
3FC0:55 55 55 6A AA AA 6A AA 10
3FC8:AA 6A AA AA 65 55 55 65 C7
3FD0:55 55 65 55 55 65 55 91
3FD8:6B FF FF 6A AA AA 6A AA 33
3FE0:AA 6A AA AA 6A A5 5A 6A 58
3FE8:A5 5E 6A A5 5E 6A A5 5E BF
3FF0:6A AB FE 6A AA AA 6A AA 95
3FF8:AA 6A AA AA 6A A5 5A A5 AB

```

DEMO

```

FF 20 POKE53280,0:POKE53265,11
      :POKE53281,0:PRINT"(CLR)"
      :POKE53265,27
BA 30 POKE147,0:SYS57812"POP-U
      P",8,1:SYS62631
FX 40 POKE147,0:SYS57812"CALCU
      LATOR.SPR",8,1:SYS62631
EH 50 :
EB 60 SYS49752,1020:REM ENABLE
      POP-UP AND SET LINE TO
      {SPACE}BRANCH TO
MJ 70 :
KC 80 AS="{RED}{13 SPACES}COPY
      RIGHT 1992"+CHR$(13)
GE 90 AS=AS+"{4 SPACES}COMPUTE
      PUBLICATIONS, INTL, LTD
      "+CHR$(13)
EC 100 AS=AS+"{10 SPACES}ALL R
      IGHTS RESERVED":FORT=1T
      06:AS=AS+CHR$(13):NEXT
      M 110 BS="{YEL}{9 SPACES}POP-
      UP DEMO PRESS <F1>":FOR
      T=1TO6:BS=BS+CHR$(13):N
      EXT
AX 120 FORT=1TOLEN(AS):PRINTMI
      D$(AS,T,1);:FORDL=1TO40
      :NEXT:NEXT
GP 130 FORT=1TOLEN(B$):PRINTMI
      D$(B$,T,1);:FORDL=1TO40
      :NEXT:NEXT
MM 140 GOTO120
PM 150 :
PP 1000 REM POP-UP CALCULATOR
SX 1010 :
DQ 1020 V=53248:POKEV+21,0:S=2
      55:FORT=2040TO2047:POK
      ET,S:S=S-1:NEXT
AX 1030 FORT=39TO46:POKEV+T,12
      :NEXT:POKEV+37,15:POKE
      V+38,11:POKEV+28,255
DQ 1040 S=0:FORT=0TO6STEP2:POK
      EV+T,32+S:S=S+48:NEXT
HK 1050 S=0:FORT=8TO14STEP2:PO
      KEV+T,32+S:S=S+48:NEXT
RM 1060 FORT=1TO7STEP2:POKEV+T
      ,98:NEXT:FORT=9TO15STE
      P2:POKEV+T,140:NEXT
ES 1070 POKEV+29,255:POKEV+23,
      255:POKEV+21,255
GJ 1080 PRINT"{HOME}{5 DOWN}":
      FORT=1TO7:PRINT"
      {RIGHT}{23 SPACES}":NE
      XT
QA 1090 POKEV+27,255:PRINT"
      {HOME}{7 DOWN}"TAB(15)
      "{2}C 7 8 9":PRINT
KK 1100 PRINTTAB(4)"{RED}M+ *
      {SPACE}+ {3 SPACES}

```

```

      {2}. 4 5 6":PRINT
DH 1110 PRINTTAB(4)"{RED}MR /
      {SPACE}- = {3 SPACES}
      {2}0 1 2 3"
QX 1120 GOSUB1280
QM 1130 RT=V:O1$=OP$
JC 1140 GOSUB1290:V1=V:O2$=OP$
BK 1150 IFOL$="+"THENRT=RT+V1
BE 1160 IFOL$="~"THENRT=RT-V1
MS 1170 IFOL$="*"THENRT=RT*V1
CH 1180 IFOL$="/"ANDV1=0THEN12
      10
SR 1190 IFOL$="/"THENRT=RT/V1
SP 1200 IFLEN(STR$(RT))<12THEN
      1230
HG 1210 PRINT"{HOME}{7 DOWN}
      {2 RIGHT}{6 SPACES}ERR
      OR":GETAS:IFAS<>"
      {HOME}"ANDAS<>"(CLR)"T
      HEN1210
XM 1220 GOTO1120
GA 1230 PRINT"{HOME}{7 DOWN}
      {2 RIGHT}{11 SPACES}":
      PRINT"{HOME}{7 DOWN}"T
      AB(13-LEN(STR$(RT)))RT
      IFO2$<>"="THENOL$=O2$:
      GOTO1140
RB 1250 POKE198,0:WAIT198,1:GE
      TA$:IFAS$="="THEN1250
GP 1260 IFAS$="+"ORAS$="-"ORAS$="
      "*"ORAS$="/"THENOL$=AS:G
      OTO1140
HF 1270 D$="":C=0:DP=0:Z=0:GOS
      UB1310:GOTO1130
XD 1280 PRINT"{HOME}{7 DOWN}
      {2 RIGHT}{BLU}
      {10 SPACES}0"
GE 1290 D$="":B$="":{11 SPACES}"
      :C=0:DP=0:Z=0
MP 1300 POKE198,0:WAIT198,1:GE
      TA$
BM 1310 IFAS$="{HOME}"ORAS$="
      {CLR}"THENCLR:GOTO1120
QC 1320 IFZAND(AS$="+"ORAS$="-"O
      RA$="*"ORAS$="/"ORAS$="
      ")THENOP$=AS:V=VAL(D$)
      :RETURN
ME 1330 IFAS$="."ANDDP=0THENDP=
      1:GOSUB1370:GOTO1360
PK 1340 IFASC(AS$)<48ORASC(AS$)>
      57ORC>9THEN1300
DG 1350 IFAS$="0"ANDDP=0ANDVAL(
      D$)=0THENGOSUB1390:GOT
      O1300
DE 1360 D$=D$+AS:PRINT"{HOME}
      {7 DOWN}"TAB(2)LEFT$(B
      $,11-LEN(D$)):D$:C=C+1:
      Z=1:GOTO1300
SD 1370 IFVAL(D$)=0THEND$="0":
      C=1:Z=1
JG 1380 RETURN
RA 1390 PRINT"{HOME}{7 DOWN}
      {2 RIGHT}{10 SPACES}0"
      :Z=1:RETURN

```

Richard Penn is a prolific Commodore programmer who lives in Montreal, Quebec, Canada.

MIMIC 128

By Joseph Sheppard

I set out to design this diversion just to show my parents that all my hours in front a computer weren't a waste of time. Mimic 128 does a good job of showing off how easy it is to use the 128's sound and graphic commands in BASIC.

Mimic 128 is a simple but entertaining game that's similar to the hand-held electronic game Simon Says. The computer lights one of four colored panels at random and plays a corresponding musical tone. You're to press the joystick up, down, left, or right to light the same panel in response. If you're successful, the computer will repeat the sequence, adding an additional panel each time to the series. The object is to mimic the computer, lighting the same sequence of panels.

Entering the Program

Mimic 128 is written entirely in BASIC 7. To help avoid typing errors, enter the program with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program to tape or disk before you exit Proofreader.

High Scores

For those with a competitive nature, Mimic 128 has a high-score sequential file named MM.HS that keeps track of the best player's name, date, and the number of panels he or she has properly responded to. The first time the program is run, MIMIC searches for this file. Since no such file exists, the first player will beat a high score of 0. The first player is guaranteed a spot on the disk for at least one session, no matter how badly he or she plays.

Tape Support

Players using tape drives should modify the OPEN statements in lines 35 and 30120 to ,1 instead of ,8. Also, tape users should immediately play a game to establish the high-score file directly behind the section of tape where the game file has been saved.

After you finish a game, the computer will check to see if you made the high score. If so, you'll be asked for the appropriate information. After a game, you'll be presented with a menu whose choices consist of Try again,

Continue, and End. Select Continue if you wish to continue with the current game. The computer won't accept a high score based on the continuation of an old game, however. Try again starts a new game, and End returns you to BASIC.

One last note: Be sure to explore the sound capabilities of your machine. Feel free to alter the sound envelopes, producing different tones and sounds for each panel. You can also make the final sound of the game (the one generated when you mess up) a little less dramatic and frightening.

MIMIC 128

```
MM 5 REM COPYRIGHT 1992 - COMP
    UTE PUBLICATIONS INTL LTD
    - ALL RIGHTS RESERVED
CG 10 DIM MD$(60),MC(60),MC$(60)
QR 20 COLOR0,1:COLOR4,1
EE 30 PRINT "{CLR}":PRINT"DIFFI
    CULTY LEVEL (1-EASIER TO
    5-BORING)":GETKEYDL
RE 32 IFDL<LORDL>5 THEN30
FG 35 OPEN2,8,2,"MM.HS,S,R"
RB 36 INPUT#2, ZN$(1),ZZ$(1),Z
    D$(1)
PG 37 DCLOSE
MB 38 ZZ(1)=VAL(ZZ$(1))
SJ 60 PRINT "{CLR}":FORZ=1TO12:
    PRINT:NEXTZ:PRINT"
    {12 SPACES}SETTING UP BO
    ARD":PRINT "{10 SPACES}TE
    N SECONDS, PLEASE.":SLEE
    P2
QE 70 FAST
RR 80 GOSUB10000
HP 90 SLOW
QS 100 NT=RND(TI):NT=INT(RND(1)
    )+1
XA 110 NT$=STR$(NT)
RQ 120 IFNT=1THENNN$="C":X=17:
    Y=9:C=6
QX 130 IFNT=2THENNN$="D":X=26:
    Y=12:C=7
JK 140 IFNT=3THENNN$="E":X=17:
    Y=15:C=8
PX 150 IFNT=4THENNN$="F":X=9:Y
    =12:C=3
EF 160 MSS=MS$+NN$
FK 170 COLOR2,2:FORZ=1TO600:NE
    XTZ:GOSUB20000
SA 180 A$=""
KS 190 FORT=1TO(LEN(MS$))
MM 200 MC(T)=JOY(2)
MX 202 IFMC(T)=1THENMC$(T)="C"
    :X=17:Y=9:C=6:GOTO210
GD 203 IFMC(T)=3THENMC$(T)="D"
    :X=26:Y=12:C=7:GOTO210
QS 204 IFMC(T)=5THENMC$(T)="E"
    :X=17:Y=15:C=8:GOTO210
JA 205 IFMC(T)=7THENMC$(T)="F"
    :X=9:Y=12:C=3:GOTO210
```

```
HS 206 GOTO200
SS 210 IFMC$(T)<>MD$(T)THEN240
SD 220 CHAR2,X-1,Y,"CORRECT"
KJ 221 PLAYMC$(T)
GA 222 FORZ=1TODL+75:NEXTZ
XK 224 COLOR3,C
KR 226 CHAR3,X-1,Y,"{7 SPACES}
    ",1
CF 234 A$=A$+MC$(T)
JP 236 NEXTT
DA 238 IFAS=MSTHEN100
XQ 240 SOUND2,2500,60,2,2470,2
    ,1,3048
SH 243 SOUND3,2000,50,2,,3,3
QF 990 PRINT"YOU GOT";LEN(MS$)
    -1,"CORRECT!":SLEEP3
XK 994 IFQ=0THENGOSUB30000
GK 995 FORZ=1TO24:PRINT:NEXTZ:
    INPUT "{BLU}DO YOU WISH
    {SPACE}TO (T)RY AGAIN,(
    C)ONTINUE{3 SPACES}OR (
    E)ND";MS
KJ 996 IFM$="T"THENQ=0:PRINT:
    PRINT:PRINT:A$="":MS$="
    ":PRINT:PRINT:PRINT:GOT
    O100
SQ 997 IFM$="C"THENQ=1:PRINT:
    PRINT:PRINT:GOTO170
GG 998 GRAPHIC0,1:END
QJ 10000 REM ***{2 SPACES}GRAP
    HIC SETUP{2 SPACES}**
    *
MH 10001 REM ***{2 SPACES}PLAY
    ING BOARD{2 SPACES}**
    *
HQ 10005 GRAPHIC4,1,23:COLOR1,
    2
SH 10100 WIDTH2:DRAW1,28,46TO7
    3,46TO78,53TO83,46TO1
    27,46TO142,75TO142,12
    3TO127,152TO83,152TO7
    8,145TO73,152TO28,152
    TO14,125TO14,74TO28,4
    6:WIDTH1
FW 10110 DRAW1,51,66TO105,66TO
    85,90TO71,90TO51,66
AR 10120 DRAW1,72,109TO84,109T
    O104,132TO51,132TO72,
    109
EH 10130 DRAW1,95,93TO115,75TO
    129,75TO129,123TO115,
    123TO95,105TO95,93
GC 10140 DRAW1,61,105TO61,93TO
    41,75TO29,75TO29,123T
    O41,123TO61,105
AQ 10200 COLOR1,16:COLOR2,3:CO
    LOR3,7
GR 10210 PAINT2,50,100,1
ED 10220 PAINT3,101,100,1
DG 10230 COLOR2,6:COLOR3,8
ES 10240 PAINT2,60,75,1
SB 10250 PAINT3,75,120,1
GD 10300 CHAR1,17,12,"MIMIC"
AB 10999 RETURN
FR 20000 REM{2 SPACES}***
    {2 SPACES}LIGHT UP PA
    NEL{2 SPACES}***
RB 20100 FORT=1TOLEN(MS$)
KK 20110 MD$(T)=MID$(MS$,T,1)
```



```

GH 20120 NEXTT
HD 20130 FORT=1TOLN(MSS)
JD 20140 PLAYMDS(T)
BD 20142 IFMDS(T)="C"THENX=17:
Y=9:C=6
DD 20144 IFMDS(T)="D"THENX=25:
Y=12:C=7
QH 20146 IFMDS(T)="E"THENX=17:
Y=15:C=8
XC 20148 IFMDS(T)="F"THENX=9:Y
=12:C=3
RQ 20150 CHAR2,X,Y,"PRESS"
KM 20160 FORZ=1TODL*100:NEXTZ
QB 20170 COLOR3,C
AS 20180 CHAR3,X,Y,"{5 SPACES}
",1
ER 20190 NEXTT
FG 20199 RETURN
JP 30000 MS=LEN(MSS)-1
EM 30010 IFMS<ZZ(1) THENRETURN
QD 30020 GRAPHIC0,1
DK 30030 PRINT"{RED}CONGRADULA
TIONSI YOU HAVE JUST
{SPACE}BEAT THE
{2 SPACES}PREVIOUS RE
CORD OF"
BF 30040 PRINT"{GRN} ";ZZ(1);"
{RED} SET BY {GRN}";Z
NS(1);" {RED}ON {GRN}
";ZDS(1);" {RED}"
CX 30050 GETKEYAS
RA 30060 PRINT:INPUT"WHAT IS Y
OUR NAME";ZNS(1)
ER 30070 INPUT"WHAT IS TODAY'S
DATE";ZDS(1)
PA 30080 ZZ(1)=MS:GS=CHRS(13)
JB 30100 PRINT:PRINT"{BLU}ONE
{SPACE}MOMENT; SAVING
SCORES..."
RP 30110 SCRATCH"MM.HS"
RJ 30120 OPEN2,8,2,"MM.HS,S,W"
EE 30130 PRINT#2, ZNS(1) GS ZZ
(1) GS ZDS(1)
QS 30140 DCLOSE
HK 30150 GRAPHIC4,0,23
AD 30160 RETURN

```

Joseph Sheppard lives in West Fork, Arkansas.

SPEEDPURGE

By Daniel Lightner

SpeedCheck is a popular utility program that checks for misspelled words in any SpeedScript word processing document. It examines text word by word, comparing words in the document with entries in its dictionary. If the program comes across a word it doesn't recognize, it highlights the word on your screen so that you can correct any misspellings immediately. If SpeedCheck comes across a correctly spelled word that isn't in its dictionary, it will also highlight that word. These new words can then be added to

SpeedCheck's dictionary. As you work with SpeedCheck, you can create your own personalized dictionary disks, which may contain thousands of words.

Words on the SpeedCheck dictionary disk are kept in sequential files, with one file for each of the 26 letters of the alphabet. As new words are added, they are tacked onto the end of the appropriate file. This makes adding words to the dictionary fast and simple, but it makes looking up words slower because words are added in random—rather than alphabetical—order. Within the file for Z, for example, *zebra* might be found between *zymurgy* and *zipper*.

The only way to find a particular item in randomly ordered data is to search sequentially from the first item until the desired item is found. Thus, when SpeedCheck looks up a word, it must hunt through all the words with the same initial letter before it can determine whether or not that word is present.

People who use SpeedCheck know how easy it is to have dictionary files containing duplicate words. SpeedCheck's Disk Manager program can help, but it's difficult to find duplicates if there are many words between them. Sometimes there may be three or four duplicate words hogging space on the disk, slowing down SpeedCheck.

Purging files manually for duplicate words can be a tedious task for a human, but it's an ideal chore for a computer. SpeedPurge is just such a utility. It searches SpeedCheck dictionary files for duplicate words and deletes them.

Entering the Program

SpeedPurge is a fairly short BASIC program. To help avoid typing errors, however, enter the program with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. When you've finished typing, be sure to save the program to disk.

Purge Your Files

SpeedPurge is easy to use; just load and run it. When you're ready to start, place the disk containing the SpeedCheck dictionary files in drive 8. SpeedPurge prompts for a filename, and you enter the letter of the alphabet that represents the file that you wish to check. For example, press A to check the A file and B to check the B file

SpeedPurge reads the file into an array and converts it to ASCII format. Then it checks the entire file for duplicate words. When SpeedPurge finds a match, it displays the word and the locations in the file where the match was found. Then it deletes one of the pair. It then continues searching until another match is found or until the entire file has been checked. When it has finished checking the file, SpeedPurge asks whether or not you wish to save the corrected file. Obviously, if no matches were found, there would be no need to save the file. Press N if you don't want to save it; press Y if you do.

After it has finished saving the file, SpeedPurge asks if you wish to check another file. Type Y to continue checking files or N to exit SpeedPurge.

SPEEDPURGE

```

SH 5 REM COPYRIGHT 1992
HK 10 REM COMPUTE PUBLICATIONS
INTL LTD
MP 15 REM ALL RIGHTS RESERVED
RG 20 CLR:DIMA$(500):OPEN15,8,
15
PK 25 PRINT"{CLR}{DOWN}
{12 RIGHT}{7}SPEEDPURGE
[2 DOWN]"
EG 30 POKE53280,0:POKE53281,0
EC 35 INPUT"{BLU}FILE {RED}(A-
Z) {BLU}";FS
XR 40 ILEN(FS)>1THEN25
PD 45 IFASC(FS)<65ORASC(FS)>90
THEN25
PS 50 OPEN2,8,2,"0:"+FS+"",S,R"
:GOSUB225:BS=FS:X=1:POKE
781,2:SYS65478:SYS65487
BG 55 SYS65487:A=PEEK(780)
KA 60 IFA>127THENA=A-64:BS=BS+
CHRS(A):AS(X)=BS:BS=FS:X
=X+1:GOTO80
CR 65 IFA=39THEN75
DH 70 IFA<64THENA=A+64
JM 75 BS=BS+CHRS(A)
QJ 80 IFST=0THEN55
QE 85 CLOSE2:POKE781,0:SYS6547
8:X=X-1
KS 90 Z=1
PQ 95 IT=0:PRINT"{DOWN}{7}":FO
RT=ZTOX:AS=AS(T):PRINT"
{UP}{8 SPACES}{8 LEFT}";
T;"-";X:FORR=1TOX
EQ 100 IFA$=AS(R)THENIFR<>TTHE
NGOSUB220
FS 105 NEXTR,T
KA 110 IFIT=0THEN125
AG 115 IFIT=XTHENX=X-1:GOTO95
RP 120 FORT=ITOX-1:AS(T)=AS(T
+1):NEXTT:X=X-1:GOTO95
FA 125 PRINT"{BLU}":FORT=1TOX:
PRINTT;AS(T):AS(T)=RIGH
T$(AS(T),LEN(AS(T))-1)

```


PROGRAMS

```

EP 130 BS="":FORR=1TOLEN(AS(T)
)~1:A=ASC(MIDS(AS(T),R,
1)):IFA>63THENA=A-64
MB 135 BS=BS+CHR$(A):NEXTR=A-A
SC(RIGHT$(AS(T),1)):A=A
+64:BS=BS+CHR$(A)
SJ 140 AS(T)=BS:NEXTT
SR 145 PRINT{DOWN}{7}SAVE THI
S FILE {RED}Y/N"
RE 150 GETAS:IFAS=" "THEN150
GP 155 IFAS="N"THEN190
PG 160 IFAS<>"Y"THEN150
AR 165 PRINT#15,"S0:"+F$:GOSUB
230
QS 170 OPEN2,8,2,"0:"+F$+"S,W
":POKE781,2:SYS65481:PO
KE780,13:SYS65490
PK 175 FORT=1TOX:FORR=1TOLEN(A
$(T)):A$=MIDS(AS(T),R,1
):A=ASC(A$):POKE780,A
AD 180 SYS65490
JS 185 NEXTR,T:CLOSE2:POKE781,
3:SYS65481:GOSUB230
KG 190 PRINT{DOWN}{3}FINISHED
I"
RK 195 PRINT{DOWN}{7}DO ANOTH
ER FILE {RED}Y/N"
CS 200 GETAS:IFAS=" "THEN200
KG 205 IFAS="Y"THEN20
XX 210 IFAS="N"THENCLOSE15:END
XX 215 GOTO200
JD 220 PRINT{DOWN}{BLU}FOUND
{SPACE}A MATCHI {RED}";
CHR$(34);A$(R);CHR$(34)
;" {BLU}";T;"{RED}&
{BLU}";R
GA 225 Z=T:IT=R:T=X:X=RETURN
SS 230 INPUT#15,EN,EM$,ET,ES
MF 235 PRINT{DOWN}{RED}"EN;EM
$;ET;ES:IFEN>1THENCLOSE
15:STOP
MF 240 RETURN

```

Daniel Lightner programs and raises Himalayan cats in Sidney, Montana.

ALPHABETIZER

By Todd Piltingsrud

As many 64 and 128 programmers know from experience, original and public domain programs can quickly fill up your disk library. Finding a desired file is no problem when there are only a few programs on a disk, but when file after file scrolls by during a directory listing, it can be a hassle. Wouldn't it be easier if all files were in alphabetical order?

Alphabetizer was written as a solution to that problem. It reads a disk directory, reorganizes it, and then saves it back to disk in alphabetical order. The directory stays in alphabetical order until you add additional files or programs.

Alphabetizer consists of two pro-

grams. The main program is in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader. See "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you exit Proofreader.

This program loads a short machine language program. You'll have to use MLX, our machine language program, to enter it. Save it with the name ALPHA.ML, as this is the name used by the BASIC program. When MLX prompts, respond with the following values.

Starting address: C000

Ending address: C147

Putting Disks in Order

Using Alphabetizer is simple. After running it, select a disk you want to alphabetize and place it in the drive. Press A to alphabetize it or press D to see its directory. When you have finished, press Q to quit.

ALPHABETIZER

```

CP 1 REM COPYRIGHT 1992 - COMP
UTE PUBLICATIONS INTL LTD
- ALL RIGHTS RESERVED
CG 5 IFPEEK(49152)<>160THENLOA
D"ALPHA.ML",8,1
QB 10 PRINT{CLR}"TAB(11)"
{DOWN}{A}*****
{S}"
HQ 20 PRINTTAB(11)"-A - ALPHAB
ETIZE-" :PRINTTAB(11)"-D
{SPACE}- DIRECTORY
{2 SPACES}-"
HS 25 PRINTTAB(11)"-Q - QUIT
{7 SPACES}-" :PRINTTAB(11)
){Z}*****{X}"
RM 27 POKE56,142:CLR:DIMEF$(14
4),SP$(144),SS$(144)
EX 30 GETAS:IFAS="A"THEN80
EA 40 IFAS="D"THENSYS49411:GOT
0680
QP 60 IFAS<>"Q"THEN30
CB 70 PRINT{CLR}";:END
DK 80 PRINT{DOWN}READING DIRE
CTORY";OPEN1,8,15,"I":G
OSUB660:CLOSE1
PS 90 SYS49152:IL=PEEK(7):PRIN
T11"FILES"
KR 230 PRINT{DOWN}ALPHABETIZI
NG":FORT=1TO11:SP$(T)=S
P$(T)+F$(T):NEXT
KP 240 N=11:LI=1:B(LI)=N+1:M=1
DD 250 J=B(LI):I=M-1:IFJ-M<3TH
EN360
JD 260 MI=INT((I+J)/2)
KM 270 I=I+1:IFI=JTHEN320
MB 280 IFSP$(I)<=SP$(MI)THEN27
0
KX 290 J=J-1:IFI=JTHEN320

```

```

RX 300 IFSP$(J)>=SP$(MI)THEN29
0
PX 310 SP$(I)=SP$(I):SP$(I)=SP$(J
):SP$(J)=SP$:GOTO270
EH 320 IFI>MITHENI=I-1
XS 330 IFJ=MITHEN350
QC 340 SP$(I)=SP$(I):SP$(I)=SP$(M
I):SP$(MI)=SP$
KR 350 LI=LI+1:B(LI)=I:GOTO250
BC 360 IFJ-M<2THEN390
EM 370 IFSP$(M)<SP$(M+1)THEN39
0
BC 380 SP$(M)=SP$(M):SP$(M)=SP$(M
+1):SP$(M+1)=SP$
GR 390 M=B(LI)+1:LI=LI-1:IFLI>
0THEN250
QM 400 FORT=1TO11:F$(T)=RIGHT
$(SP$(T),5):SP$(T)=LEFT
$(SP$(T),27):NEXT
PS 410 OPEN1,8,15,"I":GOSUB660
:OPEN8,8,8,"#":I2=1:PRI
NT{DOWN}WRITING DIRECT
ORY"
EH 420 PRINT#1,"B-P";8;0
PP 430 C=0:READS:IFI1-I2<8THEN
PRINT#8,CHR$(0)CHR$(255
):GOTO450
JB 440 PRINT#8,CHR$(18)CHR$(S)
;
DJ 450 PRINT#8,RIGHT$(F$(I2),
3):GOTO470
GE 460 PRINT#8,F$(I2);
XD 470 PRINT#8,SP$(I2);
SA 480 IFI2=I1THEN510
PX 490 I2=I2+1:C=C+1:IFC<8THEN
460
HD 500 READS:PRINT#1,"U2";8;0;
18;S:GOTO420
CG 510 AS="":FORT=1TO32:AS=AS+
CHR$(0):NEXT
SG 520 C=C+1:IFC=8THEN540
XA 530 PRINT#8,AS;:GOTO520
MR 540 READS:PRINT#1,"U2";8;0;
18;S:CLOSE8:SYS49411:GO
TO680
JH 550 DATA 4,1,7,4,10,7,13,10
,16,13,2,16,5,2,8,5,11,
8,14,11,17,14,3,17,6,3,
9,6
HQ 560 DATA 12,9,15,12,18,15,0
,18
RE 660 INPUT#1,A,B$,C,D:IFA=0T
HENRETURN
PP 670 PRINTA;B$;C;D
GQ 680 CLOSE1:PRINT{DOWN}PRES
S RETURN"
CQ 690 GETAS:IFAS<>CHR$(13)THE
N690
AM 700 RUN

```

ALPHA.ML

```

C000:A0 08 20 EC C0 A9 00 85 D8
C008:02 A9 8E 85 03 A0 02 20 DD
C010:CF FF C8 D0 FA A9 00 F0 0F
C018:0E 20 CF FF 91 02 A5 90 13
C020:D0 0E C8 D0 F4 E6 03 91 8E
C028:02 C8 91 02 C8 4C 19 C0 99
C030:20 3B C1 38 A5 03 E9 8D E6
C038:85 03 A2 04 46 03 66 02 DE

```



```

C040:CA 10 F9 4C 9B C0 24 30 87
C048:A5 2F 85 03 A5 30 85 04 46
C050:A0 00 B1 03 DD 97 C0 F0 48
C058:15 A0 02 18 B1 03 65 03 B5
C060:48 C8 B1 03 65 04 85 04 E8
C068:68 85 03 4C 50 C0 C8 B1 6D
C070:03 DD 98 C0 D0 E3 18 A5 F5
C078:03 69 0A 95 03 A5 04 69 90
C080:00 95 04 60 A2 02 2C A2 06
C088:00 A9 03 18 75 03 95 03 3C
C090:A9 00 75 04 95 04 60 46 99
C098:D0 53 D0 A2 02 20 48 C0 7D
C0A0:A2 00 86 07 20 48 C0 A9 02
C0A8:00 85 FB A9 8E 85 FC A0 CA
C0B0:02 B1 FB F0 2B A0 00 A9 B3
C0B8:05 91 03 C8 A5 FB 91 03 51
C0C0:C8 A5 FC 91 03 20 87 C0 31
C0C8:A0 00 A9 1B 91 05 C8 18 CB
C0D0:A5 F0 69 05 91 05 C8 A5 79
C0D8:FC 91 05 20 84 C0 E6 07 DB
C0E0:A2 F8 A9 20 20 8B C0 C6 A0
C0E8:02 D0 C4 60 A9 08 AA 20 21
C0F0:BA FF A9 02 A2 46 A0 C0 55
C0F8:20 BD FF 20 C0 FF A2 08 4F
C100:4C C6 FF A0 00 20 EC C0 00
C108:20 D7 AA A0 04 20 A5 FF DC
C110:88 10 FA 48 20 A5 FF A8 FF
C118:68 AA 98 A4 90 D0 1C A0 78
C120:06 84 D3 20 CD BD E6 D3 4B
C128:20 A5 FF 20 16 E7 D0 F8 12
C130:20 D7 AA A5 C6 D0 04 A0 00
C138:02 D0 D2 A9 08 20 C3 FF 2E
C140:4C CC FF 00 00 00 00 00 1D

```

Todd Piltingsrud has subscribed to Gazette for three years and has never seen a utility that alphabetizes a directory. So he wrote one. He lives in New Richland, Minnesota.

DUPLICATE 1541

By Daniel Lightner

When you want to copy files from one disk to another with Commodore BASIC, you must first load a file, swap disks, and then use the SAVE command. This process can become tedious when you copy a disk that contains numerous programs and files.

Unlike some computers, the 64/128 doesn't come with a built-in DISKCOPY command. Using a utility program to do the job for you is one way around this problem. Duplicate 1541 is just such a utility. With it and a 1541 disk drive, you can make exact copies of any floppy disk that isn't copy-protected.

Typing It In

Duplicate 1541 is written entirely in machine language, but it loads and runs like a BASIC program. To enter it, use MLX, our machine language entry pro-

gram; see "Typing Aids" elsewhere in this section. When MLX asks for starting and ending addresses, respond with the following values.

Starting address: 0801

Ending address: 0DA8

When you've finished typing in Duplicate 1541, be sure that you save a copy of the program to disk.

Making Copies

Before attempting to copy a disk, it's a good idea to place a tab over its write-protect notch. This is just a precaution in case an accident occurs during the copy process.

When you run Duplicate, it'll prompt you to place the source disk in drive 8. This is the disk that you wish to copy. After you press the space bar, Duplicate 1541 reads the disk name and ID and starts reading sectors into memory starting at track 1. When the computer's memory is filled, the program will prompt you to place a target disk in the drive. Remove the source disk, place a blank disk in the drive, and press the space bar.

Your blank disk doesn't have to be formatted; Duplicate 1541 automatically formats it for you. To copy an entire disk, this process must be repeated three more times. You'll be prompted when to swap disks.

Duplicate 1541 isn't exactly a speedster, but it'll get the job done. To boost the copying speed a bit, the program blanks the screen and sets the 1541 to 1540 mode. If your disk has only a few files on it, copying them manually may be faster.

Duplicate 1541 will inform you when the copying process is complete. You'll then be asked if you wish to make more copies. If you do, tap the Y key. Press the N key, and Duplicate 1541 will return your computer to BASIC. When it has finished all of its tasks, Duplicate 1541 restores the screen and returns the drive to 1541 mode.

DUPLICATE 1541

```

0801:0B 08 C8 07 9E 32 30 36 76
0809:31 00 00 00 A9 00 8D 20 3A
0811:D0 8D 21 D0 78 A5 01 29 A3
0819:FE 85 01 58 20 91 0B 20 2D
0821:CC FF A9 20 8D B2 02 20 2A

```

```

0829:EC 0A A9 08 20 B1 FF A9 59
0831:6F 85 B9 20 93 FF A0 00 71
0839:B9 93 0C 20 A8 FF C8 C0 26
0841:0B D0 F5 20 AE FF A9 08 9C
0849:20 B1 FF A9 6F 85 B9 20 95
0851:93 FF A0 00 B9 9E 0C 20 BF
0859:A8 FF C8 C0 09 D0 F5 20 7A
0861:AE FF A2 02 20 C6 FF A0 F9
0869:00 A2 00 20 CF FF C9 A0 D6
0871:F0 04 9D 38 03 E8 C8 C0 40
0879:12 D0 F0 A9 2C 9D 38 03 CA
0881:E8 A0 00 20 CF FF 9D 38 22
0889:03 E8 C8 C0 02 D0 F4 8E 46
0891:34 03 A2 00 20 C6 FF 20 0D
0899:E3 0A A2 00 20 EB 0B 20 59
08A1:43 09 20 06 0B A9 02 20 1D
08A9:C3 FF 20 B4 0B 20 9F 0B 0E
08B1:20 E3 0A A2 00 20 EB 0B 99
08B9:20 A2 09 20 EC 0A 20 E3 59
08C1:0A A2 01 20 EB 0B 20 43 B0
08C9:09 20 06 0B 20 E3 0A A2 1F
08D1:01 20 EB 0B 20 A2 09 20 56
08D9:EC 0A 20 E3 0A A2 02 20 24
08E1:EB 0B 20 43 09 A2 03 20 DB
08E9:EB 0B 20 43 09 A2 04 20 E5
08F1:EB 0B 20 43 09 20 06 0B D2
08F9:20 E3 0A A2 02 20 EB 0B F1
0901:20 A2 09 A2 03 20 EB 0B 92
0909:20 A2 09 A2 04 20 EB 0B A2
0911:20 A2 09 20 EC 0A 20 E3 B2
0919:0A A2 05 20 EB 0B 20 43 8A
0921:09 A2 06 20 EB 0B 20 43 32
0929:09 20 06 0B 20 E3 0A A2 00
0931:05 20 EB 0B 20 A2 09 A2 3C
0939:06 20 EB 0B 20 A2 09 4C 6E
0941:69 0B A9 08 20 B1 FF A9 F1
0949:6F 85 B9 20 93 FF A0 00 8B
0951:B9 A7 0C 20 A8 FF C8 C0 45
0959:07 D0 F5 20 A3 0A 20 E8 18
0961:FF 20 B7 FF C9 00 D0 F9 5C
0969:A2 02 20 C6 FF A0 00 20 60
0971:CF FF 91 FB C8 C0 00 D0 77
0979:F6 A2 00 20 C6 FF 20 3C 64
0981:0A 20 D5 0A AD CF 02 CD 7A
0989:CB 02 D0 0F AD CD 02 CD 83
0991:C7 02 D0 01 60 20 2C 0A 18
0999:4C 43 09 20 22 0A 4C 43 DA
09A1:09 A2 02 20 C6 FF A9 08 B4
09A9:20 B1 FF A9 6F 85 B9 20 F7
09B1:93 FF A0 00 B9 B5 0C 20 7E
09B9:A8 FF C8 C0 07 D0 F5 20 CC
09C1:AE FF A2 02 20 C9 FF A0 68
09C9:00 B1 FB 20 D2 FF C8 C0 B2
09D1:00 D0 F6 A2 03 20 C9 FF 4D
09D9:20 3C 0A A9 08 20 B1 FF 0B
09E1:A9 6F 85 B9 20 93 FF A0 E0
09E9:00 B9 AE 0C 20 A8 FF C8 6D
09F1:C0 07 D0 F5 20 A3 0A 20 63
09F9:AE FF 20 B7 FF C9 00 D0 DA
0A01:F9 20 D5 0A AD CF 02 CD F3
0A09:CB 02 D0 0F AD CD 02 CD 05
0A11:C7 02 D0 01 60 20 2C 0A 99
0A19:4C A2 09 20 22 0A 4C A2 93
0A21:09 18 AD CF 02 69 01 8D B7
0A29:CF 02 60 18 AD CD 02 69 45
0A31:01 8D CD 02 18 A9 00 8D F7
0A39:CF 02 60 A9 08 20 B4 FF 86
0A41:A9 6F 85 B9 20 96 FF 20 CD
0A49:A5 FF 8D E0 02 C9 30 D0 58
0A51:0D 20 A5 FF 8D E1 02 C9 6A

```



```

0A59:30 D0 09 4C AB FF 20 A5 E2
0A61:FF 8D E1 02 A0 02 20 A5 28
0A69:FF 99 E0 02 C8 C9 0D D0 78
0A71:F5 20 AB FF A9 08 20 C3 6F
0A79:FF 20 40 0B 20 CC FF A9 2C
0A81:0D 20 D2 FF A9 1D 20 D2 53
0A89:FF 20 D2 FF A0 00 B9 E0 59
0A91:02 20 D2 FF C8 C9 0D D0 61
0A99:F5 68 68 68 68 A0 17 4C 96
0AA1:6E 0B AE CD 02 A9 00 20 39
0AA9:0A 0C A0 00 B9 FB 02 20 BB
0AB1:A8 FF C8 CC B0 02 D0 F4 24
0AB9:A9 20 20 A8 FF AE CF 02 95
0AC1:A9 00 20 0A 0C A0 00 B9 EB
0AC9:FB 02 20 A8 FF C8 CC B0 58
0AD1:02 D0 F4 60 18 A5 FB 69 78
0AD9:00 85 FB A5 FC 69 01 85 3E
0AE1:FC 60 A9 A8 85 FB A9 0D C8
0AE9:85 FC 60 20 40 0B A0 00 7D
0AF1:B9 C2 0C 20 D2 FF C8 C0 FF
0AF9:2C D0 F5 20 E4 FF C9 20 F3
0B01:D0 F9 4C 19 0B 20 40 0B 7D
0B09:A0 00 B9 ED 0C 20 D2 FF 0C
0B11:C8 C0 2C D0 F5 4C FC 0A 33
0B19:20 9F 0B AD 11 D0 29 EF 71
0B21:8D 11 D0 A9 20 B1 FF 1B
0B29:A9 6F 85 B9 20 93 FF A0 2C
0B31:00 B9 BC 0C 20 A8 FF C8 7A
0B39:C0 03 D0 F5 4C AE FF A9 B0
0B41:02 20 C3 FF AD 11 D0 09 35
0B49:10 8D 11 D0 A9 08 20 B1 59
0B51:FF A9 6F 85 B9 20 93 FF 8D
0B59:A0 00 B9 BF 0C 20 A8 FF 25
0B61:C8 C0 03 D0 F5 4C AE FF B7
0B69:20 40 0B 00 B9 18 0D 2F
0B71:20 D2 FF C8 C0 33 D0 F5 43
0B79:20 E4 FF C9 00 F0 F9 C9 F6
0B81:4E F0 07 C9 59 F0 06 4C 5F
0B89:79 0B 4C E2 FC 4C 20 08 38
0B91:A0 00 B9 4B 0D 20 D2 FF 72
0B99:C8 C0 5D D0 F5 60 A9 01 82
0BA1:A2 92 A0 0C 20 BD FF A9 24
0BA9:02 A2 08 A0 02 20 BA FF 7A
0BB1:4C C0 FF A9 4E 8D 35 03 CE
0BB9:A9 30 8D 36 03 A9 3A 8D 86
0BC1:37 03 18 AD 34 03 69 03 95
0BC9:8D 34 03 AD 34 03 A2 35 17
0BD1:A0 03 20 BD FF A9 0F A2 40
0BD9:08 A0 0F 20 BA FF 20 C0 D6
0BE1:FF A9 0F 20 C3 FF 20 3C E0
0BE9:0A 60 BD 76 0D 8D C5 02 60
0BF1:8D CD 02 BD 7D 0C 8D C7 5D
0BF9:02 BD 84 0C 8D C9 02 8D F6
0C01:CF 02 BD 8B 0C 8D CB 02 22
0C09:60 8D B4 02 8E B3 02 A2 55
0C11:00 8E B0 02 A2 09 8E B5 0F
0C19:02 A0 B0 AD B3 02 DD 56 03
0C21:0C AD B4 02 FD 57 0C 90 57
0C29:0F 8D B4 02 AD B3 02 FD 21
0C31:56 0C 8D B3 02 C8 D0 E3 1D
0C39:98 CA F0 11 C9 B0 F0 03 75
0C41:8D B5 02 2C B5 02 30 05 AB
0C49:AD B2 02 F0 05 29 7F 20 20
0C51:61 0C CA 10 C4 60 01 00 21
0C59:0A 00 64 00 E8 03 10 27 9D
0C61:8C B1 02 AC 8F 02 99 FB F3
0C69:02 C9 20 F0 04 C8 8C B0 15
0C71:02 AC B1 02 60 01 09 11 36
0C79:12 19 1A 1F 08 10 11 18 D0
0C81:19 1E 23 00 00 00 00 00 12

```

```

0C89:00 00 14 14 14 12 11 11 81
0C91:10 23 55 31 20 32 20 30 72
0C99:20 31 38 20 30 42 2D 50 4C
0CA1:20 32 20 31 34 34 55 31 BB
0CA9:20 32 20 30 20 55 32 20 40
0CB1:32 20 30 20 42 2D 50 20 7A
0CB9:32 20 30 55 49 2D 55 49 41
0CC1:2B 0D 9A 20 20 50 55 54 49
0CC9:20 1C 53 4F 55 52 43 45 18
0CD1:20 9A 44 49 53 4B 20 49 0F
0CD9:4E 20 44 52 49 56 45 20 1D
0CE1:1C 50 52 45 53 53 20 53 36
0CE9:50 41 43 45 0D 9A 20 20 6A
0CF1:50 55 54 20 1C 54 41 52 1B
0CF9:47 45 54 20 9A 44 49 53 5F
0D01:4B 20 49 4E 20 44 52 49 D6
0D09:56 45 20 1C 50 52 45 53 0F
0D11:53 20 53 50 41 43 45 0D FA
0D19:96 20 20 43 4F 59 20 4D
0D21:43 4F 4D 50 4C 45 54 45 C4
0D29:44 20 21 21 21 0D 0D 9A 95
0D31:20 20 4D 41 4B 45 20 41 12
0D39:4E 4F 54 48 45 52 20 43 54
0D41:4F 50 59 3F 20 1C 59 2F 89
0D49:4E 0D 96 93 0D 20 20 44 47
0D51:55 50 4C 49 43 41 54 45 55
0D59:20 31 35 34 31 9A 20 CC
0D61:20 43 4F 50 59 52 49 47 39
0D69:48 54 31 39 39 32 0D F3
0D71:20 20 43 4F 4D 50 55 54 AB
0D79:45 20 50 55 42 4C 49 43 B6
0D81:41 54 49 4F 4E 53 20 49 B8
0D89:4E 54 4C 20 4C 54 44 0D B4
0D91:20 20 41 4C 4C 20 52 49 81
0D99:47 48 54 53 20 52 45 53 51
0DA1:45 52 56 45 44 0D 0D EA 6D

```

Daniel Lightner is a regular contributor who lives in Sidney, Montana.

RAILROAD SOLITAIRE

By Donald G. Klich

Have you ever been caught up in a simple game that's so challenging that you have a hard time turning it off? Railroad Solitaire for the 128 is just such a game.

This card game for one person was originally created to be used as a pastime while traveling by train, since little space was available for conventional games of solitaire. The object of the game is ultimately to discard the entire deck while working with only the four currently dealt cards.

Typing It In

Railroad Solitaire is written entirely in BASIC 7.0 and works with a 40-column screen. To help avoid typing errors, enter it with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you exit Proofreader.

Playing a Hand

You may discard the middle two cards of the set of four that appear onscreen if the bracketing cards are of the same suit or value. If all four cards match in suit or value, then all four can be discarded. If you can't play, you must request another card. This card is placed at the right-hand side of the screen, and the card on the left is moved offscreen and temporarily "lost." When discards occur, lost cards from the left move back to fill the spaces. If you're lucky enough to have insufficient lost cards to fill in from the left, new cards will be dealt to fill in from the right.

Onscreen prompts will tell you which keys to press to discard or request cards. Unlike solitaire played with actual cards, this computerized version won't let you cheat or make an improper move.

When you've gone through the deck, discarding all that you can, the game will end, and you'll be informed of any remaining cards. You'll then have the opportunity to play again and better your score.

Be prepared for long hours of play to beat the odds. It took the author an hour to win, just so he could test all the logic involved.

RAILROAD SOLITAIRE

```

EQ 10 REM COPYRIGHT 1992 - COM
      REM PUBLICATIONS INTL L
      REM TD - ALL RIGHTS RESERVED
PR 20 REM $$ CONTAINS SUIT CHA
      REM RACTERS
MJ 30 REM $$$ CONTAINS SUIT PI
      REM XELS
KH 40 REM C CONTAINS SUIT COLO
      REM RS
CX 50 REM VS CONTAINS CARD LAY
      REM OUT DATA
SB 60 REM DN CONTAINS DECK CAR
      REM D VALUES
FJ 70 REM DS CONTAINS DECK CAR
      REM D SUITS
BF 80 REM WN CONTAINS WORK CAR
      REM D VALUES
KB 90 REM WS CONTAINS WORK CAR
      REM D SUITS
GH 100 REM DP/WP ARE THE DECK/
      REM WORK POINTERS
CJ 110 DIM$(4),VS(13),DN(52),
      REM DS(52),WN(52),WS(52):TS
      REM =52:Q=0
QH 120 C(0)=11:C(1)=1:C(2)=11:
      REM C(3)=1:C(4)=2

```



```

GQ 130 SS(0)=CHR$(154):SS(1)=C
HR$(152):SS(2)=CHR$(147
):SS(3)=CHR$(129):SS(4)
=CHR$(64)
GB 140 FORI=0TO51STEP13:FORJ=0
TO12:DN(I+J)=J:DS(I+J)=
I/13:NEXTJ:NEXTI
QG 150 VS(0)="A 03081656563236
"
HE 160 VS(1)="2 04081656563216
3256"
MH 170 VS(2)="3 05081656563216
32563236"
EP 180 VS(3)="4 06081656562416
401624564056"
FQ 190 VS(4)="5 07081656562416
4016245640563236"
AD 200 VS(5)="6 08081656562416
40162456405624364036"
HS 210 VS(6)="7 09081656562416
40162456405624364036324
6"
JG 220 VS(7)="8 10081656562416
40162456405624364036324
63227"
SA 230 VS(8)="9 11081656562416
40162456405624294029244
340433237"
BF 240 VS(9)="1012081656562416
40162456405624294029244
3404332223250"
FA 250 VS(10)="J 0208165656"
RK 260 VS(11)="Q 0208165656"
KE 270 VS(12)="K 0208165656"
MJ 280 VS(13)="[2 SHIFT-SPACE]
00"
BE 290 COLOR0,2:COLOR1,1:COLOR
4,2:GOSUB840:WIDTH2:GRA
PHIC2,1,21
SH 300 FORI=0TO3:CHAR1,0,10,SS
(I):DRAW1,3,82TO4,82TO4
,83TO3,83:SSHAPESS$(I),
0,80,7,87:NEXTI:CHAR1,0
,10," "
PH 310 REM ****SHUFFLE DECK
CH 320 PRINT"[BLK]{7 SPACES}I'
M SHUFFLING THE DECK":F
ORI=1TO100:F=INT(RND(1)
*51):T=INT(RND(1)*51):B
N=DN(F):BS=DS(F):DN(F)=
DN(T):DS(F)=DS(T):DN(T)
=BN:DS(T)=BS:NEXTI
HA 330 REM ****INITIAL SETUP
CS 340 FORDP=0TO3:WN(DP)=DN(DP
):WS(DP)=DS(DP):NEXT:WP
=DP:GOSUB770
KK 350 PRINT"[BLK]ENTER {CYN}C
{BLK}TO RECEIVE A CARD
":PRINT"ENTER {CYN}2
{BLK}TO DISCARD THE MID
DLE CARDS":PRINT"ENTER
{SPACE}{CYN}4 {BLK}TO D
ISCARD ALL CARDS":IFDP>
52THEN570
MQ 360 GETKEYZ$:IFZ$<>"C"THEN4
20
QG 370 IFDP=52THEN570:ELSE:GOS
UB400:GRAPHIC2,1,21:GOS
UB770:GOTO350
RB 380 REM ****ROUTINE TO READ
A CARD
EP 390 IFDP>=52THENWN(WP)=13:W
S(WP)=4:WP=WP+1:RETURN
KB 400 WN(WP)=DN(DP):WS(WP)=DS
(DP):DP=DP+1:WP=WP+1:RE
TURN
MD 410 REM ****ROUTINE TO REMO
VE MIDDLE CARDS
MM 420 IFZ$<>"2"THEN470
GE 430 IFWN(WP-4)=WN(WP-1)THEN
450
DA 440 IFWS(WP-4)<>WS(WP-1)THE
NSOUND1,4000,5:GOTO350
PE 450 WN(WP-3)=WN(WP-1):WS(WP
-3)=WS(WP-1):WP=WP-2
DQ 460 IFWP>3THENGRAHIC2,1,21
:GOSUB770:GOTO350:ELSE:G
OSUB390:GOTO460
JR 470 IFZ$<>"4"THENSOUND1,400
0,5:GOTO350
RQ 480 REM ****ROUTINE TO REMO
VE ALL FOUR CARDS
KQ 490 IFWN(WP-4)<>WN(WP-3)THE
N520
CS 500 IFWN(WP-3)<>WN(WP-2)THE
N520
DQ 510 IFWN(WP-2)=WN(WP-1)THEN
WP=WP-4:GOTO460
SS 520 IFWS(WP-4)<>WS(WP-3)THE
N550
AX 530 IFWS(WP-3)<>WS(WP-2)THE
N550
JF 540 IFWS(WP-2)=WS(WP-1)THEN
WP=WP-4:GOTO460
MX 550 SOUND1,4000,5:GOTO350
FE 560 REM ****SAVE SCORE ROU
TINE
RB 570 SOUND1,8000,5:PRINT"
{BLK}GAME OVER. YOU HAD
";WP-Q;" CARDS REMAINI
NG":IFWP-Q<TSTHENTS=WP-
Q
MX 580 PRINT"YOUR BEST SCORE I
S ";TS
CE 590 Q=0:PRINT"PLAY AGAIN? Y
/N":GETKEYZ$:IFZ$="Y"TH
ENGRAHIC2,1,21:GOTO320
XD 600 IFZ$="N"THENEND:ELSE570
QF 610 REM ****DISPLAY A CARD
HH 620 COLOR1,C(S):CHAR1,X+1,Y
+1,MID$(VS(V),1,2):IFV=
9THENCHAR1,X+6,Y+8,MID$
(V$(V),1,2):ELSECHAR1,X
+7,Y+8,MID$(VS(V),1,2)
GP 630 X=X*8:Y=Y*8
KA 640 FORI=0TO{(VAL(MID$(VS(V
),3,2))) -1}*4STEP4
KX 650 GSHAPESS$(S),X+VAL(MID$
(V$(V),5+I,2)),Y+VAL(MI
D$(VS(V),7+I,2)):NEXTI
DR 660 COLOR1,1:BOX1,4+X,4+Y,6
7+X,75+Y:COLOR1,8:IFV<>
10THEN690
BH 670 CIRCLE1,36+X,40+Y,12,16
,90,270:CIRCLE1,36+X,40
+Y,4,8,90,270
GQ 680 DRAW1,40+X,40+YTO40+X,2
4+YTO48+X,24+YTO48+X,40
+Y:DRAW1,24+X,40+YTO32+
X,40+Y:PAINT1,28+X,44+Y
:GOTO750
GR 690 IFV<>11THEN720
HM 700 CIRCLE1,36+X,40+Y,12,16
:CIRCLE1,36+X,40+Y,4,8:
PAINT1,28+X,40+Y
HH 710 DRAW1,36+X,54+YTO40+X,6
0+YTO47+X,60+YTO39+X,51
+Y:PAINT1,44+X,58+Y:GOT
O750
CG 720 IFV<>12THENRETURN
BP 730 DRAW1,24+X,56+YTO24+X,2
4+YTO32+X,24+YTO32+X,56
+YTO24+X,56+Y:PAINT1,28
+X,28+Y:DRAW1,32+X,36+Y
TO40+X,24+YTO48+X,24+YT
O32+X,44+Y:PAINT1,44+X,
26+Y
DE 740 DRAW1,32+X,36+YTO40+X,5
6+YTO48+X,56+YTO36+X,32
+Y:PAINT1,40+X,48+Y
SX 750 WIDTH1:BOX1,19+X,16+Y,5
2+X,63+Y:WIDTH2:RETURN
BS 760 REM ****DISPLAY THE WIN
DOW
MM 770 FORZ=0TO3:V=WN(WP-4+Z):
S=WS(WP-4+Z):X=10*Z:Y=5
:IFV=13THENQ=Q+1
SG 780 GOSUB620:NEXTZ:IFQ=4THE
N820
DM 790 IFQ<>2THENRETURN
BP 800 IFWN(WP-4)=WN(WP-3)THEN
820
FD 810 IFWS(WP-4)=WS(WP-3)THEN
820
XM 820 PRINT"{5 SPACES}YOU WIN
!!!!":SOUND1,10000,5:G
OTO590
FF 830 REM ****GAME INSTRUCTIO
NS
AB 840 GRAPHIC0,1:PRINT"{RED}
{5 DOWN}{11 SPACES}RAIL
ROAD SOLITAIRE":PRINT"
{BLU}{2 DOWN}THIS GAME
{SPACE}WAS INVENTED FOR
PLAYING ON A":PRINT"TR
AIN WHERE SPACE TO SPRE
AD OUT IS RARE."
MM 850 PRINT"{DOWN} THE IDEA O
F THE GAME IS TO DISCAR
D THE":PRINT"CARDS THAT
ARE BETWEEN END CARDS
{SPACE}OF THE":PRINT"SA
ME VALUE OR SUIT.
{2 SPACES}ALL FOUR CARD
S CAN"
FC 860 PRINT"BE DISCARDED IF
{SPACE}THEY ARE OF THE
{SPACE}SAME":PRINT"VALU
E OR THE SAME SUIT.":PR
INT" IF THERE IS NO PLA
Y GET THE NEXT CARD.":P
RINT"{3 DOWN}PRESS ANY
{SPACE}KEY TO START"
EH 870 GETKEYZ$:RETURN

```

Donald G. Klich lives in Mount Pros-
pect, Illinois.

128 GRAPHIC DUMP

Donald G. Klich

Here are two programs similar to the 128 text screen dumps submitted by Bruce Bowden (Screen Dump 128, December 1991). Rather than working with text, however, these programs will dump bitmapped graphic screens to your printer.

While you can't scale the pictures you send to a printer, you may select either of two different-sized printouts. Graphic Small prints a picture that is 40 x 25 characters in size, and Graphic Large prints one 80 x 50 characters. Both of these utilities are easy to install and use. They're also fairly short, so it won't take you long to type them in.

Typing It In

Graphic Small and Graphic Large are both written in BASIC. To help avoid typing errors, enter the programs with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save copies of your programs before exiting Proofreader.

Printing Pictures

Load and run either program as you would a normal BASIC program. When you run either program, there will be a slight pause, and then the READY prompt will return. The programs use function keys f1, f2, and f3 and put machine language code in locations \$1300-\$13AS. After you run one of the programs, you can then load and run an application that contains a graphic screen. When you reach the point that you'd like a printout of the screen, press the Stop key. Make sure your printer is turned on and ready.

Small Pictures

If you're using Graphic Small, proceed by pressing f1. (Be sure your printer is turned on and ready.) The screen will be garbled and then go blank. At this point, press f2. Shortly after that, your picture will start to print. When the printout is complete, the picture onscreen will be ungarbled.

Large Pictures

To use Graphic Large, load and run the program and then run your graphics program as above. Press f1 and f2 to start the printing process, but press

f3 when the printing is complete to return to the applications program. You can continue with your graphics program by entering a CONT command.

These programs have been tested only on a Seikosha SP1000A and an Epson FX-80 printer, but they should work on other graphics printers, too. Make sure any printer interface you may be using is set for transparent mode.

For those interested in modifying these programs for other printers, two printer-control commands are used in lines 60 and 70 in Graphic Small. The first instructs the printer to suppress the vertical spacing between lines, and the second precedes each print-line set to instruct the printer to print in graphics mode. Note that abbreviated commands (uppercase characters) are used at times so that the required BASIC code will fit in the special area reserved for function key definitions.

GRAPHIC SMALL

```
EQ 10 REM COPYRIGHT 1992 - COM
    PUTE PUBLICATIONS INTL L
    TD - ALL RIGHTS RESERVED
CG 20 REM GRAPHIC SCREEN PRINT
    ER FOR COMMODORE 128
SK 30 REM THIS PROGRAM, ONCE A
    CTIVATED WILL DUMP THE C
    URRENT GRAPHICS SCREEN
JX 40 REM TO THE PRINTER DEVI
    CE 4. {2 SPACES} IT IS ACTI
    VATED BY THE F1 AND F2 K
    EYS,
AB 50 REM IN A 40 BY 25 CHARAC
    TER DISPLAY
SM 60 KEY1,"OP1,4:PR1,CH(27)CH
    (65)CH(8):SYS4864:FAST"+
    CHR$(13)
JX 70 KEY2,"FOA=8192T016191STE
    320:PR1,CH(27)CH(42)CH(4
    )CH(64)CH(1);:F0B=0T0319
    :PR1,CH(255-PEE(A+B));:N
    E:PR1:NE:SLOW:SYS4864:CL
    O1:END"+CHR$(13)
GC 80 KEY3,"":KEY4,"":KEY5,"":
    KEY6,"":KEY7,"":KEY8,""
EB 90 FORQ=4864T04987:READZ$:P
    OKEQ,DEC(Z$):NEXT
GB 100 DATA 18,90,13,00,00,00,
    00,00,00,00,00,18,18,18
    ,FF,FF,18,18,18,00,00,0
    0,A9,00,85,FB,A9,20,85,
    FC,A0,00,A2,00,B1,FB,99
    ,03,13,C8,C0,08,D0,F6,A
    0,00,18,AD,15,13
HP 110 DATA 1E,03,13,69,00,E8,
    E0,08,F0,07,0A,8D,15,13
    ,4C,2E,13,99,0B,13,A2,0
    0,8E,15,13,C8,C0,08,D0,
    DE,A2,00,A0,00,B9,0B,13
    ,91,FB,EA,C8,C0,08,D0,F
    5,A0,00,18,A9,0B
```

```
DE,A2,00,A0,00,B9,0B,13
    ,91,FB,EA,C8,C0,08,D0,F
    5,A0,00,18,A9,0B
SM 120 DATA 65,FB,85,FB,A9,00,
    65,FC,85,FC,C9,3F,D0,07
    ,A5,FB,C9,40,D0,01,60,4
    C,22,13
```

GRAPHIC LARGE

```
EQ 10 REM COPYRIGHT 1992 - COM
    PUTE PUBLICATIONS INTL L
    TD - ALL RIGHTS RESERVED
CG 20 REM GRAPHIC SCREEN PRINT
    ER FOR COMMODORE 128
SK 30 REM THIS PROGRAM, ONCE A
    CTIVATED WILL DUMP THE C
    URRENT GRAPHICS SCREEN
EA 40 REM TO THE PRINTER DEVI
    CE 4. IT IS ACTIVATED BY
    {SPACE}THE F1, F2 AND F3
    KEYS
RC 50 REM IN A 80 X 50 CHARACT
    ER DISPLAY
FG 60 KEY4,"":KEY5,"":KEY6,"":
    KEY7,"":KEY8,""
ES 70 KEY1,"OP1,4:PR1,CH(27)CH
    (65)CH(8):SYS4864:FAST:A
    $=CH(27)+CH(42)+CH(4)+CH
    (128)+CH(2):D=252:E=251:
    F=255"+CHR$(13)
KE 80 KEY2,"FOA=8192T016191STE
    320:F0C=1T02:PR1,CH(13);
    AS;:F0B=0T0319:POKE,(F-P
    EE(A+B)):POK253,C:SYS498
    8:PR1,CH(PEE(D));:CH(PEE(
    D));:NEB,C,""+CHR$(13)
BS 90 KEY3,"$LOW:SYS4864:CLO1"
    +CHR$(13)
JP 100 FORQ=4864T05029:READZ$:
    POKEQ,DEC(Z$):NEXT
CG 110 DATA 18,90,13,00,00,00,
    00,00,00,00,00,18,18,18
    ,FF,FF,18,18,18,00,00,0
    0,A9,00,85,FB,A9,20,85,
    FC,A0,00,A2,00,B1,FB,99
    ,03,13,C8,C0,08,D0,F6,A
    0,00,18,AD,15,13
DE 120 DATA 1E,03,13,69,00,E8,
    E0,08,F0,07,0A,8D,15,13
    ,4C,2E,13,99,0B,13,A2,0
    0,8E,15,13,C8,C0,08,D0,
    DE,A2,00,A0,00,B9,0B,13
    ,91,FB,EA,C8,C0,08,D0,F
    5,A0,00,18,A9,0B
JP 130 DATA 65,FB,85,FB,A9,00,
    65,FC,85,FC,C9,3F,D0,07
    ,A5,FB,C9,40,D0,01,60,4
    C,22,13,A5,FD,C9,01,F0,
    08,06,FB,06,FB,06,FB,06
    ,FB,A9,00,85,FC,A2,04,1
    8,06,FB,90,06,A9
FD 140 DATA 03,05,FC,85,FC,CA,
    F0,07,06,FC,06,FC,18,90
    ,EB,60
```

Donald Klich, who lives in Mount Prospect, Illinois, is the 128 programmer who wrote Railroad Solitaire.

QUIZ WIZ

By Rizwaan Ahmed Khan

Quiz Wiz is a program for creating multiple-choice quizzes on the 64. The program is so easy to use that even a beginner can use it without reading the instructions. Just select the menu options.

Quiz Wiz lets the parent or teacher enter questions and answers on a variety of subjects. The program then creates a quiz in multiple-choice format with the correct answer and three wrong answers for each question. It provides the correct answers and a score when the student finishes the quiz.

When you enter a question and answer, you aren't required to supply three possible answers as alternate choices. The program asks the question and then supplies the correct answer along with three other choices that it selects at random from the other answers you've entered. The correct answer is never in a predictable location.

Entering the Program

Quiz Wiz is written entirely in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program before you exit Proofreader.

Make New Entries

When you first run the program, select the option to make new entries. You're then prompted to choose a subject. If the subject you want isn't on the screen, press the Up Arrow key and define the subject of your choice.

You may then enter questions and answers. Each question and answer is allowed a maximum of 80 characters. To exit during the input process, press the @ key and then press Return.

Continue Making Entries

Note the menu. If you wish to continue making entries, select the appropriate choice. If you select the option to make new entries, all work in memory will be erased.

Correction Mode

You can flip through your entries by pressing the < and > keys. When you find the question you want, press Return, and a small menu will appear.

This menu will allow you to fully edit or delete your entries. In this mode, you can rename the topic chosen by pressing the R key.

In correction mode you cannot enter the main menu by pressing the @ key. In this mode, you can use the cursor keys for more editing potential. After you've made any corrections, press Return to exit to the main menu.

Saving Files

When you've entered a minimum of four questions and their answers, you may then save your file. Save files by selecting that option from the main menu. If you try to save a file with a name that is already on the disk, the earlier version will first be scratched.

Loading Files

Load a saved file into memory anytime you want to take a quiz. Any entries that may still be in memory will be erased. After loading, you're automatically quizzed in multiple-choice format. To see a directory at any time, press the D key.

Scratching Files

Select this option from the main menu to erase any file on disk. You need only enter the filename to have the program erase it.

Quiz Time

A quiz begins right after loading, but if you've entered at least four questions, you can take a test immediately. Press the Commodore key; then press the letter next to the answer of your choice.

If you answer incorrectly, the correct answer will be displayed for a short time. At the end of the quiz, your mistakes will again be displayed. You can flip through them by pressing Return. This process lets you review your errors for as long as you wish. After reviewing the final mistake, the computer will display your score. You may then exit to the main menu by pressing f1 or take the quiz again by pressing the Commodore key.

Adding New Entries

You can exit the quiz at any time by pressing f1. To enter more questions, select the option from the menu to continue making entries.

Tape Support

Users with tape drives can easily alter the program to suit their needs. Change the OPEN commands in lines 390 and 1007 to tape format. Then delete lines 62, 80, 915, 930, 935, 980, 982, 985, 986, 987, 990, 992, 993, 995, and 997. These lines contain the routines for calling the disk directory and for scratching files.

QUIZ WIZ

```
ME 0 REM COPYRIGHT 1992 COMPUT
E PUBLICATIONS INTL LTD -
ALL RIGHTS RESERVED
PB 1 DIMD$(200):DIMES$(200):DIM
F$(400):PRINTCHR$(8):PRIN
TCHR$(14)
MQ 5 PRINT"{CLR}{WHT}{2 DOWN}
{4 SPACES}{RVS}
{11 SPACES}{YEL}QUIZ WIZ
{WHT}{14 SPACES}":PRINT"
{6 SPACES}MENU:"
XD 10 PRINT"{DOWN}{6 SPACES}
{YEL}{RVS}PRESS (1) TO M
AKE NEW ENTRIES.":POKE53
281,2:POKE53280,6
XJ 15 IF$(4)<>"THENPRINT"
{DOWN}{6 SPACES}{RVS}
{YEL}PRESS (2) TO SAVE E
NTRIES."
XD 20 PRINT"{DOWN}{6 SPACES}
{RVS}{YEL}PRESS (3) TO L
OAD ENTRIES.":IF$(1)="
THEN30
FX 25 PRINT"{DOWN}{6 SPACES}
{RVS}{YEL}PRESS (4) TO C
ONTINUE{OFF}{19 SPACES}
{RVS}MAKING ENTRIES."
CQ 30 IF$(1)<>"THENPRINT"
{DOWN}{6 SPACES}{RVS}
{YEL}PRESS (5) FOR CORRE
CTION MODE."
RK 35 PRINT"{DOWN}{6 SPACES}
{RVS}{YEL}PRESS (6) TO S
CRATCH FILES."
BD 40 PRINT"{DOWN}{6 SPACES}
{RVS}{CYN}PRESS F1 TO RE
TURN TO MENU.{DOWN}"
XG 45 PRINT"{12 SPACES}BY
{2 SPACES}RIZWAAN KHAN"
DF 46 PRINT"{HOME}{2 DOWN}":FO
RI=1TO19:PRINT"{WHT}
{4 RIGHT}{+}{31 RIGHT}
{+}{3 RIGHT}":NEXT
JE 50 PRINT"{4 SPACES}{RVS}
{33 SPACES}{OFF}";
BF 55 GETA$:IFA$="5"THENIF$(1
)<>"THENJ=1:GOTO715
BB 60 IFA$="1"THEN940
HA 62 IFA$="D"THEN980
AG 65 IFA$="2"ANDE$(3)<>"THEN
360
MG 70 IFA$="3"THEN435
JX 72 IFA$="L"THEN1000
AF 75 IFA$="4"THENZE$="1":GOTO
```


PROGRAMS

```

175
KP 80 IFAS="6"THEN915
MJ 85 IFPEEK(56321)=223AND$ (4
) <> " " THEN M=1:W=1:Q=0:GOT
0520
EK 90 GOTO55
XQ 95 PRINT "{OFF}{CLR}{HOME}
{3 DOWN}{10 SPACES}{PUR}
{RVS}DEFINE SUBJECT"
XQ 100 PRINT "{DOWN}{11 SPACES}
{WHT}1)MATH"
PE 105 PRINT "{DOWN}{11 SPACES}
2)ECONOMICS"
HF 110 PRINT "{DOWN}{11 SPACES}
3)SCIENCE"
KS 115 PRINT "{DOWN}{11 SPACES}
4)HISTORY"
MF 120 PRINT "{DOWN}{11 SPACES}
5)GEOGRAPHY"
BA 125 PRINT "{DOWN}{11 SPACES}
6)ENGLISH"
SD 127 PRINT "{DOWN}{11 SPACES}
7)OTHER{2 SPACES}"
XS 130 GETAS:IFAS="1"THENNS="M
ATH":GOTO175
BE 135 IFAS="2"THENNS="ECONOMI
CS":GOTO175
HG 140 IFAS="3"THENNS="SCIENCE
":GOTO175
BS 145 IFAS="4"THENNS="HISTORY
":GOTO175
QG 150 IFAS="5"THENNS="GEOGRAP
HY":GOTO175
BA 155 IFAS="6"THENNS="ENGLISH
":GOTO175
RS 160 IFAS=CHR$(133)THENDBS="
":GOTO5
XX 165 IFAS="7"THENINPUT"SUBJE
CT":NS:GOTO175
KR 170 GOTO130
AG 175 PRINT "{CLR}{BLU}{RVS}
{40 SPACES}":IFDBS="1"TH
ENDBS="":GOTO5
ED 180 IFZE="1"THENX=X+1:ZE="
"
MD 185 PRINT "{GRN}{HOME}{RVS}
{SPACE}QUESTION NUMBER"
X"{YEL}SUBJECT:"NS""
GJ 190 PRINT "{WHT}{HOME}
{2 DOWN}{5 SPACES}ENTER
QUESTION (@ TO QUIT)"
{3 SPACES}:POKE53280,2
EQ 191 IFDBS="1"THENPRINT"
{YEL}{HOME}{3 DOWN}
{2 RIGHT}"DAS"":PRINT"
{HOME}{3 DOWN}";
HS 195 INPUTDS(X):IFDS(X)="@"A
NDBS="1"THEN190
SD 245 IFDS(X)="@"ANDX<>1THENX
=X-1:ZE="1":GOTO5
RF 246 IFDS(X)="@"ANDX=1THEN5
RE 247 IFDBS="1"ANDDS(X)<>"TH
ENDS(X)=LEFT$(DS(X),80)
:GOTO845
PS 250 IFDS(X)<>" "THENDS(X)=LE
FT$(DS(X),80):GOTO275
XS 255 PRINT "{CLR}{HOME}{BLU}
{RVS}{40 SPACES}":GOTO1

```

```

85
KD 275 PRINT:PRINT"(HOME)
{13 DOWN}{WHT}{DOWN}
{4 SPACES}ENTER ANSWER"
HH 276 IFDBS="1"THENPRINT"
{YEL}{HOME}{15 DOWN}
{2 RIGHT}"EAS"":PRINT"
{HOME}{15 DOWN}";
XX 280 INPUTES(X):IFES(X)="@"A
NDBS="1"THEN275
XQ 285 IFDBS="1"AND$ (X)<>" "TH
ENDS(X)=LEFT$(ES(X),80)
:GOTO845
RA 290 IFES(X)="@"THEN5
XX 335 IFES(X)<>" "THENDS(X)=LE
FT$(ES(X),80):X=X+1:GOT
0175
GR 340 GOTO275
PR 360 NAM$="":PRINT"{CLR}
{DOWN} TYPE IN FILE NAM
E TO SAVE":INPUTNAM$:IF
NAM$=""THEN5
KJ 390 KS$="":OPEN7,8,0,NAM$:IN
PUT#7,KS:IFKS=""THENCLO
SE7:GOTO405
JS 395 CLOSE7:PRINT"{2 DOWN} S
CRATCHING OLD FILE.":FT
S$="S0":FTS=FTS+NAM$
FM 400 OPEN15,8,15,FTS:CLOSE15
SG 405 OPEN7,8,1,NAM$:PRINT"
{CLR}{HOME}{6 DOWN}
{6 SPACES}{WHT}SAVING :
NAM$":PRINT#7,NS:PRI
NT#7,X
BQ 410 FORJ=1TOX:PRINT#7,DS(J)
:NEXTJ:ZE$="1"
MP 415 FORJ=1TOX:PRINT#7,ES(J)
:NEXTJ:CLOSE7:M=1:FX=0:
Q=0
EH 430 PRINT "{CLR}{HOME}
{11 DOWN}{6 SPACES}***
{SPACE}DATA HAS BEEN SA
VED ***"
KF 431 FORI=1TO2000:NEXTI:GOTO
520
PR 435 PRINT "{CLR}{RVS}{WHT}
{DOWN} LOAD ERASES ANY
{SPACE}WORK IN' MEMORY.
{4 SPACES}ARE YOU SURE
{SPACE}(Y/N)"
DD 440 GETAS:IFAS="N"THEN5
PA 445 IFAS="Y"THEN1000
DA 450 GOTO440
DP 520 ZX=X:PRINT "{CLR}{HOME}
{SPACE}SCORE={RVS}"Q"
{OFF}{4 SPACES}QUESTI
ON NUMBER={RVS}"W"{OFF}"
EB 525 PRINT "TOTAL NUMBER OF Q
UESTIONS="X"":POKE53280
,6:POKE53281,6
HK 530 PRINT "{YEL}{RVS}
{40 SPACES}";
JG 535 PRINT "{UP}{3 SPACES}
{RVS}SUBJECT : "NS""
CR 540 PRINT "{WHT}QUESTION:
{GRN}{RVS}"DS(M)"{OFF}
{DOWN}";FS
KB 545 Y=INT(4*RND(1))+1

```

```

RA 550 T=INT((X+1-1)*RND(1))+1
:U=INT((X+1-1)*RND(1))+
1:V=INT((X+1-1)*RND(1))
+1
FQ 555 IFES(M)=ES(T)ORES(M)=ES
(U)ORES(U)=ES(T)THEN550
EM 556 IFES(V)=ES(M)ORES(V)=ES
(T)ORES(V)=ES(U)THEN550
RH 560 IFY=1THEN575
MA 562 IFY=3THEN570
QB 565 IFY=2THEN580
GJ 567 PRINT "{RVS}{WHT}A {8}"E
S(T)"{DOWN}":PRINT"
{RVS}{WHT}B {8}"ES(U)"
{DOWN}":PRINT "{RVS}
{WHT}C {8}"ES(V)"{DOWN}
"
BG 568 PRINT "{RVS}{WHT}D {8}"E
S(M)"{DOWN}":LS$="D":GOT
0585
MH 570 PRINT "{RVS}{WHT}A {8}"E
S(T)"{DOWN}":
RF 571 PRINT "{RVS}{WHT}B {8}"E
S(U)"{DOWN}":
JD 572 PRINT "{RVS}{WHT}C {8}"E
S(M)"{DOWN}":LS$="C":PRI
NT "{RVS}{WHT}D {8}"ES(V
)"{DOWN}":GOTO585
KS 575 PRINT "{WHT}{RVS}A {8}"E
S(M)"{DOWN}":
SF 576 PRINT "{RVS}{WHT}B {8}"E
S(T)"{DOWN}":
KM 577 PRINT "{RVS}{WHT}C {8}"E
S(U)"{DOWN}":LS$="A":PRI
NT "{RVS}{WHT}D {8}"ES(V
)"{DOWN}":GOTO585
GF 580 PRINT "{WHT}{RVS}A {8}"E
S(U)"{DOWN}":
SS 581 PRINT "{RVS}{WHT}B {8}"E
S(M)"{DOWN}":
HP 582 PRINT "{RVS}{WHT}C {8}"E
S(T)"{DOWN}":LS$="B":PRI
NT "{RVS}{WHT}D {8}"ES(V
)"{DOWN}":GOTO585
AM 585 GETAS:IFAS="N"THEN585
XJ 590 IFAS=CHR$(133)THENFX=0:
Q=0:GOTO5
SQ 595 IFAS<>"A"ANDAS<>"B"ANDA
S<>"C"ANDAS<>"D"THEN585
CS 600 IFAS=LSTHENQ=Q+1:PRINT"
{WHT}{2 SPACES}{RVS}COR
RECT!!";FORJ=1TO500:NE
XTJ:GOTO610
GX 605 GOTO655
AD 610 M=M+1:IFW=ZXTHENAD=FX-1
:FX=0:GOTO880
FQ 615 W=W+1:GOTO520
BP 620 PRINT "{CLR}{HOME}
{2 DOWN}{OFF}{WHT} YOU
{SPACE}SCORED{WHT}{RVS}
"Q"{OFF}OUT OF{WHT}
{RVS}"X"{OFF} QUESTIONS
":POKE53281,3
BR 625 IFX/2<=QTHENPRINT"
{2 DOWN}{2 SPACES}{RVS}
YOU PASSED!":GOTO632
GP 630 PRINT "{DOWN}{RVS}SHAME
ON YOU, YOU FAILED!!!"

```



```

HR 632 PRINT" {DOWN}{RVS}PRESS
      'F1' TO EXIT."
HF 635 PRINT"{DOWN}{RVS}PRESS
      {SPACE}COMMODORE KEY TO
      DO THE TEST AGAIN":GOT
      0640
DS 640 GETAS:IFAS=CHR$(133)THE
      N5
GP 645 IFPEEK(56321)=223THENM=
      1:W=1:Q=0:GOTO520
KS 650 GOTO640
EP 655 PRINT"{RVS}INCORRECT!
      {OFF} THE ANSWER IS":F$
      (FX)=D$(M):FX=FX+1:F$(F
      X)=E$(M):FX=FX+1
FD 660 IFY=1THENPRINT"{RVS}A
      {OFF}"E$(M)"";F$:GOTO67
      5
ES 665 IFY=2THENPRINT"{RVS}B
      {OFF}"E$(M)"";F$:GOTO67
      5
BE 670 PRINT"{RVS}C {OFF}"E$(M
      )"";F$:GOTO675
AH 675 FORJ=1TO2:POKE54276,0:P
      OKE54277,0:POKE54272,0:
      POKE54296,15
JX 680 POKE54277,129:POKE54276
      ,23
RG 685 POKE54273,137:POKE54272
      ,43:NEXTJ:FORI=1TO1500:
      NEXTI:GOTO610
EB 690 POKE1024,82:POKE1025,65
      :POKE1026,75:POKE1027,7
      2:POKE1028,65:POKE1029,
      78
JH 691 GOTO585
HR 715 PRINT"{YEL}{CLR}{HOME}
      {RVS}{11 SPACES}CORRECT
      ION MODE{14 SPACES}";
BF 720 PRINT" {RVS}{WHT} TOTAL
      QUESTIONS ENTERED="X"
      :POKE53281,6:POKE53280,
      2
DK 725 PRINT" {RVS}{CYN}QUESTI
      ON NO."J"{GRN}SUBJECT:"
      N$"{DOWN}"
DB 730 PRINT"{YEL}{RVS}QUESTIO
      N:{8}"D$(J)"";PRINT
XS 735 PRINT"{YEL}{RVS}ANSWER:
      {8}"E$(J)""
SB 740 PRINT"{DOWN} {RVS}{YEL}
      PRESS'<' TO FLIP THROUG
      H ENTRIES."
EP 741 PRINT" {RVS}{WHT}PRESS'
      RETURN'FOR CORRECTION."
FA 743 PRINT" {RVS}{WHT}PRESS'
      R'TO RENAME SUBJECT."
GE 745 GETAS:IFAS=CHR$(13)THEN
      VB=X:X=J:DB$="1":GOTO78
      8
BD 750 IFAS="."THEN782
HD 755 IFAS=CHR$(133)THENDB$="
      ":GOTO775
MG 760 IFAS="R"THENA$="":DB$="
      1":GOTO95
HH 765 IFAS=","THEN785
RJ 770 GOTO745
DM 775 IFVB>0THENX=VB:GOTO5

```

```

XP 780 GOTO5
QF 782 IFJ=XTHENJ=1:GOTO715
GF 783 J=J+1:GOTO715
JH 785 IFJ=1THENJ=X:GOTO715
JM 786 J=J-1:GOTO715
BX 788 PRINT"{DOWN} {6}{RVS}PL
      EASE SELECT --
      {3 SPACES}"
EG 790 PRINT" {RVS}(1) ALTER Q
      UESTION."
GR 795 PRINT" {RVS}(2) ALTER A
      NSWER.{2 SPACES}"
JD 800 PRINT" {RVS}(3) ALTER B
      OTH.{4 SPACES}"
DB 805 PRINT" {RVS}(4) DELETE
      {SPACE}BOTH.{3 SPACES}"
      :DA$=D$(X):EA$=E$(X)
AD 815 GETAS:IFAS="1"THENS=1:P
      RINT"{CLR}":GOTO190
GC 820 IFAS="2"THENS=2:PRINT"
      {CLR}":GOTO275
MK 825 IFAS="3"THENS=3:PRINT"
      {CLR}":GOTO190
AP 830 IFAS="4"THENMK=VB-J:DB$
      ="":GOTO860
BD 836 IFAS=CHR$(133)THENDB$="
      ":X=VB:GOTO5
PR 840 GOTO815
QF 845 IFS=1ORS=2THENX=VB:DB$=
      "":GOTO5
KM 850 IFS=3THENS=S+1:GOTO275
KJ 855 X=VB:DB$="":GOTO5
FF 860 IFJ=1ANDES(J+1)="":THENR
      UN
ER 865 IFES(J+1)="":THEND$(J)="
      ":E$(J)="":VB=VB-1:X=VB
      :GOTO5
SD 870 PRINT"{2 DOWN}
      {2 SPACES}{WHT}DELETING
      ...":FORI=1TOMK:AD$=D$(
      J+1):AV$=E$(J+1)
XK 875 D$(J)=AD$:E$(J)=AV$:J=J
      +1:NEXTI:VB=VB-1:X=VB:E
      $(J)="":D$(J)="":GOTO5
EE 880 IFF$(FX)="":THEN620
PM 885 PRINT"{CLR}{OFF}{HOME}
      {2 DOWN} {BLK}THE ONES
      {SPACE}YOU GOT WRONG AR
      E-{DOWN}":POKE53281,1
CS 890 PRINT" {RED}QUESTION -
      {SPACE}"F$(FX)"";F$:F$(
      FX)="":FX=FX+1
FP 895 PRINT" ANSWER - "F$(FX)
      "";F$:F$(FX)="":PRINT"
      {2 DOWN} {RVS}{CYN}PRES
      S RETURN"
AR 900 GETAS:IFAS<>CHR$(13)THE
      N900
QS 905 IFAD=FXTHENFX=0:GOTO620
MK 910 FX=FX+1:GOTO880
RK 915 PRINT"{CLR}{DOWN} NAME
      {SPACE}OF FILE TO SCRAT
      CH":INPUTFR$:IFFR$="TH
      EN5
XF 920 PRINT"{DOWN} INSERT DIS
      K CONTAINING FILE AND P
      RESS{3 SPACES}{RVS}RETU
      RN"

```

```

PQ 925 GETAS:IFAS<>CHR$(13)THE
      N925
AE 930 FT$="S0":FT$=FT$+FR$:O
      PEN15,8,15,FT$:CLOSE15
RS 935 PRINT"{2 DOWN}
      {2 SPACES}{RVS}{WHT}FIL
      E HAS BEEN SCRATCHED":F
      ORI=1TO3000:NEXTI:GOTO5
XX 940 PRINT"{CLR}{DOWN}{WHT}
      {SPACE}{RVS}MAKING NEW
      {SPACE}ENTRIES WILL ERA
      SE ANY OLD{OFF}
      {3 SPACES}{RVS}ENTRIES
      {SPACE}IN MEMORY"
AQ 945 PRINT" {RVS}{WHT}ARE YO
      U SURE (Y/N)""
AF 950 GETAS:IFAS="N"THENS
      5
HX 955 IFAS="Y"THEN965
DF 960 GOTO950
DS 965 CLR:DIM$(500):DIME$(50
      0):X=1:GOTO95
KK 970 PRINT"{DOWN}{2 SPACES}
      {RVS}FILE NOT FOUND":OP
      EN15,8,15,"UJ":FORI=1TO
      2000:NEXTI:CLOSE15:RUN
MB 980 I=1:PRINT"{WHT}{CLR}":O
      PEN2,8,0,"$":GET#2,AS:G
      ET#2,AS
CM 982 IFI=22THENI=1:GOTO992
DD 985 GET#2,L$:GET#2,L$:IFST=
      64THENCLOSE2:GOTO992
XJ 986 GET#2,LB$:GET#2,HB$:LN=
      ASC(LB$+CHR$(0))+256*AS
      C(HB$+CHR$(0))
MM 987 PRINT LN;
DD 988 GET#2,AS:IFAS="":THENI=I
      +1:PRINTCHR$(13);:GOTO9
      82
CD 990 PRINTAS;:GOTO988
KD 992 PRINT"{DOWN} {RVS}PRESS
      ANY KEY"
CX 993 GETAS:IFAS="":THEN993
QJ 995 IFST<>64THENPRINT"{CLR}
      ":GOTO985
JM 997 GOTO5
FH 1000 CLR:DIM$(200):DIME$(2
      00):DIME$(400):PRINTCH
      R$(8):PRINTCHR$(14)
MH 1005 PRINT"{CLR} {RVS}{WHT}
      TYPE IN FILENAME TO LO
      AD":INPUTNAM$:IFNAM$="
      "THENRUN
EK 1007 N$="":OPEN7,8,0,NAM$:I
      NPUT#7,N$
EK 1008 INPUT#7,X:IFN$="":THENC
      LOSE7:GOTO970
BR 1009 PRINT"{CLR}{HOME}
      {5 DOWN}{4 SPACES}LOAD
      ING : {RVS}"NAM$""
HB 1010 FORJ=1TOX:INPUT#7,D$(J
      ):NEXTJ:ZE$="1"
JC 1012 FORJ=1TOX:INPUT#7,E$(J
      ):NEXTJ:CLOSE7:M=1:FX=
      0:Q=0:W=1:GOTO520

```

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Machine Language Entry Program MLX for Commodore 64

Ottis R. Cowper

Type in and save some copies of MLX—you'll want to use it to enter future ML programs from Gazette. When you're ready to enter an ML program, load and run MLX. It asks you for a starting address and an ending address. These addresses appear in the article accompanying the MLX-format program listing you're typing.

If you're unfamiliar with machine language, the addresses (and all other values you enter in MLX) may appear strange. Instead of the usual decimal numbers you're accustomed to, these numbers are in *hexadecimal*—a base 16 numbering system commonly used by ML programmers. Hexadecimal—hex for short—includes the numerals 0–9 and the letters A–F. But even if you know nothing about ML or hex, you should have no trouble using MLX.

After you've entered the starting and ending addresses, you'll be offered the option of clearing the workspace. Choose this option if you're starting to enter a new listing. If you're continuing a listing that's partially typed from a previous session, don't choose this option. A functions menu will appear. The first option in the menu is Enter Data. If you're just starting to type in a program, pick this. Press the E key and type the first number in the first line of the program listing. If you've already typed in part of a program, type the line number where you stopped typing at the end of the previous session (be sure to load the partially completed program before you resume entry). In any case, make sure the address you enter corresponds to the address of a line in the listing you are entering. Otherwise, you'll be unable to enter the data correctly. If you pressed E by mistake, you can return to the command menu by pressing Return alone when asked for the address. (You can get back to the menu from most options in the program by pressing Return with no other input.)

Entering a Listing

Once you're in Enter mode, MLX prints the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight data bytes and a checksum. Although an

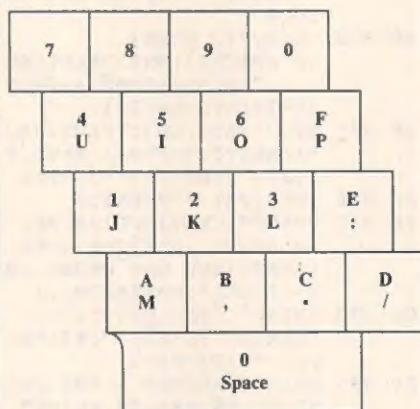
MLX-format listing appears similar to the "hex dump" listings from a machine language monitor program, the extra checksum number on the end allows MLX to check your typing.

When you enter a line, MLX recalculates the checksum from the eight bytes and the address and compares this value to the number from the ninth column. If the values match, you'll hear a bell tone, the data will be added to the workspace area, and the prompt for the next line of data will appear. But if MLX detects a typing error, you'll hear a low buzz and see an error message. The line will then be redisplayed for editing.

Invalid Characters Banned

Only a few keys are active while you're entering data, so you may have to unlearn some habits. You *do not* type spaces between the columns; MLX automatically inserts these for you. You *do not* press Return after typing the last number in a line; MLX automatically enters and checks the line after you type the last digit.

64 MLX Keypad



Only the numerals 0–9 and the letters A–F can be entered. If you press any other key (with some exceptions noted below), you'll hear a warning buzz. To simplify typing, a numeric keypad function is included. The keypad is active only while entering data. Addresses must be entered with the normal letter and number keys. The figure below shows the keypad configuration.

MLX checks for transposed characters. If you're supposed to type in A0

and instead enter 0A, MLX will catch your mistake. There is one error that can slip past MLX: Because of the checksum formula used, MLX won't notice if you accidentally type FF in place of 00, and vice versa. And there's a very slim chance that you could garble a line and still end up with a combination of characters that adds up to the proper checksum. However, these mistakes should not occur if you take care while entering data.

Editing Features

To correct typing mistakes before finishing a line, use the Inst/Del key to delete the character to the left of the cursor. If you mess up a line badly, press Ctr/Home to start the line over. The Return key is also active, but only before any data is typed on a line. Pressing Return at this point returns you to the command menu. After you type a character, MLX disables Return until the cursor returns to the start of a line. Remember, press Ctr/Home to quickly get to a line-number prompt. To make corrections in a line that MLX has redisplayed for editing, compare the line on the screen with the one printed in the listing and then move the cursor to the mistake and type the correct key. The cursor-left and -right keys provide the normal cursor controls. (The Inst/Del key now works as an alternative cursor-left key.) You cannot move left beyond the first character in the line. If you try to move beyond the rightmost character, you'll reenter the line. During editing, Return is active; pressing it tells MLX to recheck the line. You can press the Ctr/Home key to clear the entire line if you want to start from scratch or if you want to get to a line-number prompt to use Return to get back to the menu.

Display Data

The second menu choice, Display Data, examines memory and shows the contents in the same format as the program listing (including the checksum). When you press D, MLX asks you for a starting address. Be sure that the starting address you give corresponds to a line number in the listing. Otherwise, the checksum display will be meaningless. MLX displays program lines until it reaches the end of the program, at

which point the menu is redisplayed. You can pause the display by pressing the space bar. (MLX finishes printing the current line before halting.) Press the space bar again to restart the display. To break out of the display and get back to the menu before the ending address is reached, press Return.

Other Menu Options

Two more menu selections let you save programs and load them back into the computer. These are Save File and Load File. When you press S or L, MLX asks you for the filename. You'll then be asked to press either D or T to select disk or tape.

You'll notice the disk drive starting and stopping several times during a load or save. This is normal behavior. MLX opens and reads from or writes to the file instead of using the usual LOAD and SAVE commands. Also note that the drive prefix 0: is added to the filename (line 750), so this should *not* be included when entering the name. This also precludes the use of @ for save-with-replace, so be sure to give each version saved a different name.

Remember that MLX saves the entire workspace area from the starting address to the ending address, so the save or load may take longer than you might expect if you've entered only a small amount of data from a long listing. When you're saving a partially completed listing, make sure to note the address where you stopped typing.

MLX reports the standard disk or tape error messages if any problems are detected during the save or load. It also has three special load error messages: INCORRECT STARTING ADDRESS, which means the file you're trying to load does not have the starting address you specified when you ran MLX; LOAD ENDED AT address, which means the file you're trying to load ends before the ending address you specified when you started MLX; and TRUNCATED AT ENDING ADDRESS, which means the file you're trying to load extends beyond the ending address you specified when you started MLX. If you see one of these messages and feel certain that you've loaded the right file, exit and rerun MLX, being careful to enter the correct start-

ing and ending addresses.

The Quit menu option has the obvious effect—it stops MLX and enters BASIC. The Run/Stop key is disabled, so the Q option lets you exit the program without turning off the computer. (Of course, Run/Stop—Restore also gets you out.) You'll be asked for verification; press Y to exit to BASIC, or press any other key to return to the menu. After quitting, you can type RUN again and reenter MLX without losing your data, as long as you don't use the Clear Workspace option.

The Finished Product

When you've finished typing all the data for an ML program and saved your work, you're ready for the results. Refer to the corresponding article for details on loading and running the program.

An Ounce of Prevention

Don't take chances—use The Automatic Proofreader to type the new MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses; then use the display option to verify that the data has been entered correctly. Test the save and load options to ensure that you can recall your work from disk.

64 MLX

```
SS 10 REM VERSION 1.1: LINES 8
    30,950 MODIFIED, LINES 4
    85-487 ADDED
EK 100 POKE 56,50:CLR:DIM IN$,
    I,J,A,B,A$,B$,A(7),N$
DM 110 C4=48:C6=16:C7=7:Z2=2:Z
    4=254:Z5=255:Z6=256:Z7=
    127
CJ 120 FA=PEEK(45)+Z6*PEEK(46)
    :BS=PEEK(55)+Z6*PEEK(56)
    :H$="0123456789ABCDEF"
SB 130 R$=CHR$(13):L$="{LEFT}"
    :S$=" ":D$=CHR$(20):Z$=
    CHR$(0):T$="{13 RIGHT}"
CQ 140 SD=54272:FOR I=SD TO SD
    +23:POKE I,0:NEXT:POKE
    {SPACE}SD+24,15:POKE 78
    8,52
FC 150 PRINT "{CLR}"CHR$(142)CH
    R$(8):POKE 53280,15:POK
    E 53281,15
EJ 160 PRINT T$ {RED}{RVS}
    {2 SPACES}{8 &}
```

```
{2 SPACES}"SPC(28)"
{2 SPACES}{OFF}{BLU} ML
X II {RED}{RVS}
{2 SPACES}"SPC(28)"
{12 SPACES}{BLU}"
FR 170 PRINT "{3 DOWN}
{3 SPACES}COMPUTE!S MA
CHINE LANGUAGE EDITOR
{3 DOWN}"
JB 180 PRINT "{BLK}STARTING ADD
RESS{4}";:GOSUB300:SA=A
D:GOSUB1040:IF F THEN18
0
GF 190 PRINT "{BLK}{2 SPACES}EN
DING ADDRESS{4}";:GOSUB
300:EA=AD:GOSUB1030:IF
{SPACE}F THEN190
KR 200 INPUT "{3 DOWN}{BLK}CLEA
R WORKSPACE {Y/N}{4}";A
$:IF LEFT$(A$,1)<>"Y"TH
EN220
PG 210 PRINT "{2 DOWN}{BLU}WORK
ING...";:FORI=BS TO BS+
EA-SA+7:POKE I,0:NEXT:P
RINT"DONE"
DR 220 PRINTTAB(10)" {2 DOWN}
{BLK}{RVS} MLX COMMAND
{SPACE}MENU {DOWN}{4}":
PRINT T$ {RVS}E{OFF}NTE
R DATA"
BD 230 PRINT T$ {RVS}D{OFF}ISP
LAY DATA":PRINT T$
{RVS}L{OFF}OAD FILE"
JS 240 PRINT T$ {RVS}S{OFF}AVE
FILE":PRINT T$ {RVS}Q
{OFF}UIT{2 DOWN}{BLK}"
JH 250 GET A$:IF A$=N$ THEN250
HK 260 A=0:FOR I=1 TO 5:IF A$=
MID$( "EDLSQ",I,1)THEN A
=I:I=5
FD 270 NEXT:ON A GOTO420,610,6
90,700,280:GOSUB1060:GO
TO250
EJ 280 PRINT {RVS} QUIT ":INPU
T "{DOWN}{4}ARE YOU SURE
{Y/N}";A$:IF LEFT$(A$,
1)<>"Y"THEN220
EM 290 POKE SD+24,0:END
JX 300 IN$=N$:AD=0:INPUTN$:IF
LEN(IN$)<>4THENRETURN
KF 310 B$=IN$:GOSUB320:AD=A:B$
=MID$(IN$,3):GOSUB320:A
D=AD*256+A:RETURN
PP 320 A=0:FOR J=1 TO 2:A$=MID
$(B$,J,1):B=ASC(A$)-C4+
(A$>"0")*C7:A=A*C6+B
JA 330 IF B<0 OR B>15 THEN AD=
0:A=-1:J=2
GX 340 NEXT:RETURN
CH 350 B=INT(A/C6):PRINT MID$(
H$,B+1,1);:B=A-B*C6:PRI
NT MID$(H$,B+1,1);:RETU
RN
RR 360 A=INT(AD/Z6):GOSUB350:A
=AD-A*Z6:GOSUB350:PRINT
":";
BE 370 CK=INT(AD/Z6):CK=AD-Z4*
CK+Z5*(CK>Z7):GOTO390
```


PROGRAMS

```

PX 380 CK=CK*Z2+Z5*(CK>Z7)+A
JC 390 CK=CK+Z5*(CK>Z5):RETURN
QS 400 PRINT"[DOWN]STARTING AT
{4}";:GOSUB300:IF IN$<>
N$ THEN GOSUB1030:IF F
{SPACE}THEN400
EX 410 RETURN
HD 420 PRINT"[RVS] ENTER DATA
{SPACE}":GOSUB400:IF IN
S=N$ THEN220
JK 430 OPEN3,3:PRINT
SK 440 POKE198,0:GOSUB360:IF F
THEN PRINT IN$:PRINT"
{UP}{5 RIGHT}";
GC 450 FOR I=0 TO 24 STEP 3:B$
=S$:FOR J=1 TO 2:IF F T
HEN B$=MID$(IN$,I+J,1)
HA 460 PRINT"[RVS]"B$LS$;:IF I<
24THEN PRINT"[OFF]";
HD 470 GET A$:IF A$=N$ THEN470
FK 480 IF (A$>"")AND(A$<"")OR(A
$>"@")AND(A$<"G")THEN540
GS 485 A=- (A$="M")-2*(A$=",")-
3*(A$=".")-4*(A$="/")-5
*(A$="J")-6*(A$="K")
FX 486 A=A-7*(A$="L")-8*(A$=":
")-9*(A$="U")-10*(A$="I
")-11*(A$="O")-12*(A$="
P")
CM 487 A=A-13*(A$=S$):IF A THE
N A$=MID$( "ABCD123E456F
0",A,1):GOTO 540
MP 490 IF A$=R$ AND ((I=0)AND(J
=1)OR F)THEN PRINT B$;:
J=2:NEXT I=24:GOTO550
KC 500 IF A$="HOME" THEN PRI
NT B$:J=2:NEXT I=24:NEX
T:F=0:GOTO440
MX 510 IF (A$="RIGHT")ANDF TH
ENPRINT B$LS$;:GOTO540
GK 520 IF A$<>L$ AND A$<>D$ OR
((I=0)AND(J=1))THEN GOS
UB1060:GOTO470
HG 530 A$=L$+S$+L$:PRINT B$LS$;
:J=2-J:IF J THEN PRINT
{SPACE}L$;:I=I-3
QS 540 PRINT A$;NEXT J:PRINT
{SPACE}S$;
PM 550 NEXT I:PRINT"PRINT"[UP]
{5 RIGHT}";:INPUT#3,IN$
:IF IN$=N$ THEN CLOSE3:
GOTO220
QC 560 FOR I=1 TO 25 STEP3:B$=
MID$(IN$,I):GOSUB320:IF
I<25 THEN GOSUB380:A(I
/3)=A
PK 570 NEXT:IF A<>CK THEN GOSU
B1060:PRINT"[BLK]{RVS}
{SPACE}ERROR: REENTER L
INE {4}":F=1:GOTO440
HJ 580 GOSUB1080:B=BS+AD-SA:FO
R I=0 TO 7:POKE B+I,A(I
):NEXT
QQ 590 AD=AD+8:IF AD>EA THEN C
LOSE3:PRINT"[DOWN]{BLU}
** END OF ENTRY **{BLK}
{2 DOWN}":GOTO700
GQ 600 F=0:GOTO440
QA 610 PRINT"[CLR]{DOWN}{RVS}
{SPACE}DISPLAY DATA ":G
OSUB400:IF IN$=N$ THEN2
20
RJ 620 PRINT"[DOWN]{BLU}PRESS:
{RVS}SPACE{OFF} TO PAU
SE, {RVS}RETURN{OFF} TO
BREAK{4}{DOWN}"
KS 630 GOSUB360:B=BS+AD-SA:FOR
I=BT0 B+7:A=PEEK(I):GOS
UB350:GOSUB380:PRINT S$
;
CC 640 NEXT:PRINT"[RVS]";:A=CK
:GOSUB350:PRINT
KH 650 F=1:AD=AD+8:IF AD>EA TH
ENPRINT"[DOWN]{BLU}** E
ND OF DATA **":GOTO220
KC 660 GET A$:IF A$=R$ THEN GO
SUB1080:GOTO220
EQ 670 IF A$=S$ THEN F=F+1:GOS
UB1080
AD 680 ONFGOTO630,660,630
CM 690 PRINT"[DOWN]{RVS} LOAD
{SPACE}DATA ":OP=1:GOTO
710
PC 700 PRINT"[DOWN]{RVS} SAVE
{SPACE}FILE ":OP=0
RX 710 IN$=N$:INPUT"{DOWN}FILE
NAME{4}";IN$:IF IN$=N$
{SPACE}THEN220
PR 720 F=0:PRINT"[DOWN]{BLK}
{RVS}T{OFF}APE OR {RVS}
D{OFF}ISK: {4}";
FP 730 GET A$:IF A$="T"THEN PR
INT"TT{DOWN}":GOTO880
HQ 740 IF A$<>"D"THEN730
HH 750 PRINT"D{DOWN}":OPEN15,8
,15,"I0":B=EA-SA:IN$="
0":+IN$:IF OP THEN810
SQ 760 OPEN 1,8,8,IN$+"P,W":G
OSUB860:IF A THEN220
FJ 770 AH=INT(SA/256):AL=SA-(A
H*256):PRINT#1,CHR$(AL)
;CHR$(AH);
PE 780 FOR I=0 TO B:PRINT#1,CH
R$(PEEK(BS+I));:IF ST T
HEN800
FC 790 NEXT:CLOSE1:CLOSE15:GOT
O940
GS 800 GOSUB1060:PRINT"[DOWN]
{BLK}ERROR DURING SAVE:
{4}":GOSUB860:GOTO220
MA 810 OPEN 1,8,8,IN$+"P,R":G
OSUB860:IF A THEN220
GE 820 GET#1,A$,B$:AD=ASC(A$+Z
$)+256*ASC(B$+Z$):IF AD
<>SA THEN F=1:GOTO850
RX 830 FOR I=0 TO B:GET#1,A$:P
OKE BS+I,ASC(A$+Z$):IF(
I<>B)AND ST THEN F=2:AD
=I:I=B
FA 840 NEXT:IF ST<>64 THEN F=3
FQ 850 CLOSE1:CLOSE15:ON ABS(F
>0)+1 GOTO960,970
SA 860 INPUT#15,A,A$:IF A THEN
CLOSE1:CLOSE15:GOSUB10
60:PRINT"[RVS]ERROR: "A
$
GQ 870 RETURN
EJ 880 POKE183,PEEK(FA+2):POKE
187,PEEK(FA+3):POKE188,
PEEK(FA+4):IFOP=0THEN92
0
HJ 890 SYS 63466:IF(PEEK(783)A
ND1)THEN GOSUB1060:PRIN
T"[DOWN]{RVS} FILE NOT
{SPACE}FOUND ":GOTO690
CS 900 AD=PEEK(829)+256*PEEK(8
30):IF AD<>SA THEN F=1:
GOTO970
SC 910 A=PEEK(831)+256*PEEK(83
2)-1:F=F-2*(A<EA)-3*(A>
EA):AD=A-AD:GOTO930
KM 920 A=SA:B=EA+1:GOSUB1010:P
OKE780,3:SYS 63338
JF 930 A=BS:B=BS+(EA-SA)+1:GOS
UB1010:ON OP GOTO950:SY
S 63591
AE 940 GOSUB1080:PRINT"[BLU]**
SAVE COMPLETED **":GOT
O220
XP 950 POKE147,0:SYS 63562:IF
{SPACE}ST>0 THEN970
FR 960 GOSUB1080:PRINT"[BLU]**
LOAD COMPLETED **":GOT
O220
DP 970 GOSUB1060:PRINT"[BLK}
{RVS}ERROR DURING LOAD:
{DOWN}{4}":ON F GOSUB98
0,990,1000:GOTO220
PP 980 PRINT"INCORRECT STARTIN
G ADDRESS (";:GOSUB360:
PRINT")":RETURN
GR 990 PRINT"LOAD ENDED AT ";:
AD=SA+AD:GOSUB360:PRINT
D$:RETURN
FD 1000 PRINT"TRUNCATED AT END
ING ADDRESS":RETURN
RX 1010 AH=INT(A/256):AL=A-(AH
*256):POKE193,AL:POKE1
94,AH
FF 1020 AH=INT(B/256):AL=B-(AH
*256):POKE174,AL:POKE1
75,AH:RETURN
FX 1030 IF AD<SA OR AD>EA THEN
1050
CR 1040 IF (AD>511 AND AD<6528
0) THEN GOSUB1080: F=0
: RETURN
HC 1050 GOSUB1060:PRINT"[RVS}
{SPACE}INVALID ADDRESS
{DOWN}{BLK}":F=1:RETU
RN
AR 1060 POKE SD+5,31:POKE SD+6
,208:POKE SD,240:POKE
{SPACE}SD+1,4:POKE SD+
4,33
DX 1070 FOR S=1 TO 100:NEXT:GO
TO1090
PF 1080 POKE SD+5,8:POKE SD+6
,240:POKE SD,0:POKE SD+
1,90:POKE SD+4,17
AC 1090 FOR S=1 TO 100:NEXT:PO
KE SD+4,0:POKE SD,0:PO
KE SD+1,0:RETURN

```